# The Chemical Age

**A Weekly Journal Devoted to Industrial and Engineering Chemistry**

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## Contents



*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

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## Our Annual Spring Issue

THE present Annual Spring Issue of THE CHEMICAL AGE, numbering a hundred pages, indicates in its numerous chemical trade announcements the wide range of products and plant that this country now produces, and these, in their turn, will carry into distant overseas markets, where there are numerous potential consumers not directly approachable, a wider trade knowledge of the extent to which their chemical and engineering needs can be supplied from this country. On the other hand, the information concerning foreign markets and the chemicals they import is of interest to those who are searching for new openings overseas. In addition to general matter of this kind, the present issue contains a Lancashire Supplement, in which Mr. Rex Furness for a second year reviews broadly the chemical industries of the country, and numerous trade notices appear of typical Lancashire products. These all point to a vigorous belief in the future of our chemical industries, and represent just the spirit that is called for in these difficult times.

Recently we have passed through a period distinguished for sharp depression of prices, disturbances of credit, repeated falls in the Bank rate, and rising unemployment figures. These conditions, though disturbing at the moment, are really so many steps towards that condition of normality and stability which must be reached some day, and the sooner the better. Far too many people whose knowledge of practical economics is limited to the artificial conditions which have ruled the world since August, 1914, still cling to the impression that prices can be arranged, values adjusted, markets secured, and production controlled by various artificial regulations and arrangements. These devices may help us over a crisis now and again, but in the end business can never be sound until it is on a natural basis. There is, therefore, much more cause for satisfaction than for dismay in the present conditions. We have now got so far with the work of restoration as to make the old £ worth 16s. or 17s. There is, however, still 3s. or 4s. worth of war-time inflation in it, and that has to go before we can once again be sure that a pound is a pound, and proceed with solid business on that firm foundation. If the recent conditions have achieved, as it seems possible they may have done, a large part of this unpleasant but healthy and necessary task, then we are all the nearer to a normal state of affairs and a prospect of prosperity that is real.

## A Chemical Headquarters Scheme

THE scheme for the organisation of a London chemical headquarters, which Professor Thorpe explained so clearly and comprehensively in his presidential address to the Chemical Society on Thursday, is not so grandiose as some of its theoretical predecessors, and proportionately it is the more practical and business-like. It seems to us a thoroughly sincere scheme, devoid of mere window-dressing, and designed, obviously after careful investigation, to enable four major societies to work together in much closer association than has hitherto been possible, without surrendering their own autonomy, and without unduly burdening themselves in the matter of finance. These societies are the Chemical Society, the Society of Chemical Industry, the Institution of Chemical Engineers, and the Institution of the Rubber Industry. With these it is hoped that a number of "tenant" societies will in time become associated, and the larger the number of these the more representative will the ultimate arrangement be. It will be noted that the Institute of Chemistry is not included. That will readily be understood on the ground that the Institute long since provided itself with its own headquarters, and that it is not a "society" in the general sense but a chartered body of professionally qualified chemists.

The present "Chemistry House" proposal is a

scheme within a scheme. Some two years ago seven organisations associated with mining, metallurgy, and fuel contemplated occupying between them three-fifths of a site in Victoria Street, Westminster, the property of the Ecclesiastical Commissioners. On finding a chemical group prepared to co-operate, they decided to take up the whole site, the two-fifths remaining over from the original plan being allocated to the chemical organisations. One complete floor of the building will be occupied by a joint library, and the top floor will be utilised as a restaurant and club. Five floors, each with a floor space of 8,500 square feet, will be available for the occupying societies, and the chemical group will have at its disposal on each floor two-fifths, or 3,400 square feet, of this accommodation. The central library is regarded as one of the chief features of the scheme. The Chemical Society is handing over its own library of 33,000 volumes as a nucleus, and in consideration of this, the Society will be housed rent free, as it is at present in Burlington House.

The finance of the scheme, if Professor Thorpe's figures can be adhered to, looks fairly simple. The cost of the proposed new building, the site, and furnishing is estimated at £350,000, and the chemical group's share of this will be £140,000. It is an agreeable surprise to hear that definite promises to the amount of £130,000 have already been received, so that the most troublesome problem of all may be regarded as virtually settled. The delicate question of joint or separate subscriptions is shrewdly handled. Persons who wish to join both the Chemical Society and the Society of Chemical Industry may do so for a composite fee of £3 10s.; existing members of one or other society may continue their separate membership, if they desire, and pay their separate contributions to their own society; it is, however, thought that some who are members of both may continue (*ex gratia*) to pay their present separate contributions, instead of taking advantage of the reduced joint fee. The publications of the two societies are to be regrouped under a joint editorial board. The scheme has been carefully drawn, and those responsible may be congratulated on having evolved so simple and workable a plan in rather difficult circumstances.

## Proposed Chemical Standardising Body

We learn that the Council of the Association of British Chemical Manufacturers has received a memorandum from the Standardisation of Tar Products Tests Committee which has just completed a very valuable piece of work on the standardisation of the tests to be used in the buying and selling of tar products. The memorandum sets forth cogent reasons why steps should be taken to form a chemical standardising body which could do for chemistry what the British Engineering Standards Association has done and is doing for engineering. The Council of the Association, we understand, is much impressed by these arguments and considers that the whole position should be carefully explored. The Council feels that the first step is to arrange for a conference of representatives of the various bodies likely to be interested in the proposal in order to ascertain whether there is, in this country, a sufficiently strong feeling regarding the need for a chemical standardising body. If it is found that there is, then the conference can appoint a small committee to draw up a detailed scheme, and to investigate the question of finance.

A copy of the memorandum is being sent to a large number of organisations interested in chemistry, with an invitation for them to nominate a representative to the proposed conference, the date of which will be settled after replies have been received from all the bodies approached. While every effort has been made to make the list of organisations invited as complete as possible, there is always the chance that certain interests may have been overlooked. The Association is anxious, therefore, that the fullest publicity should be given to this proposal, so that interested parties who may not have received an invitation may be able to obtain a copy of the memorandum by communicating with the Association at 166, Piccadilly, London, W.1.

## The Calendar

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| Mar. 29 | Finsbury Technical College Old Students' Association. Dinner. | Trocadero Restaurant, London. |
| Apl. 1 | Leicester Literary and Philosophical Society (Chemistry Section): Annual General Meeting. 8 p.m. | Museum, Princess Road, Leicester. |
| 2 | Society of Dyers and Colourists (Midland Section): Joint Meeting with Foremen Dyers' Guild: "Dyeing of Hosiery containing Mixed Fibres." J. G. Grundy. | Globe Hotel, Leicester. |
| 2 | Society of Public Analysts. 8 p.m. | Burlington House, London, |
| 3 | Chemical Society. "Attempts to Prepare Cyanine Dyes from Quaternary Salts of 2-methylacenaphthpyridine and of ms-methylacridine." F. M. Hamer. "10-chloro-5:10: dihydrophenarsazine and its derivatives. Part XII. Absorption spectra." C. S. Gibson, E. S. Hiscocks, J. D. A. Johnson, and J. L. Jones. 8 p.m. | Burlington House, Piccadilly, London. |
| 3 | Institution of Chemical Engineers: "Pulverised Fuel." J. T. Dunn and Burrows Moore. | St. Ermins, Caxton Street, London. |
| 4 | Institution of Chemical Engineers. Eighth Annual Corporate Meeting. 11.30 a.m. "The Rôle of Science in Industry." J. Arthur Reavell. 12.15 p.m. "The High Pressure Equipment of the Chemical Research Laboratory, Teddington." H. Tongue. 2.15 p.m. Annual Dinner. 7 p.m. | Hotel Victoria, Northumberland Avenue, London. |
| 4 | Society of Chemical Industry (Liverpool Section): Annual meeting. | Liverpool. |
| 4 | Society of Chemical Industry (Birmingham and Midland Section): Annual Meeting. 6.30 p.m. "Some Little Known Causes of Stone Decay." A. R. Warnes. 7 p.m. | Chamber of Commerce, New Street, Birmingham. |
| 4 | Society of Chemical Industry (Manchester Section): "The Attitude of the Government towards Scientific Research." Major A. E. Church. 7 p.m. | 17, Albert Square, Manchester. |
| 4 | Chemical and Allied Industries—North-East Coast Dinner. 7.30p.m. | Tilley's Restaurant, Blackett Street, Newcastle-on-Tyne. |
| 7 | Society of Chemical Industry (London Section): "Circumstantial Evidence from Fibres and Hairs." Dr. C. Ainsworth Mitchell. "Detection and Estimation of Small Quantities of Chlorine in Flour." Dr. D. W. Kent-Jones and Dr. C. W. Herd. 8 p.m. | Burlington House, Piccadilly, London. |

# A Scheme for a London Chemical Headquarters

## Outlined by Professor Thorpe

*In his presidential address to the annual meeting of the Chemical Society on Thursday, March 28, the President (Professor J. F. Thorpe, C.B.E., D.Sc., F.R.S.) dealt at considerable length with a new scheme for the unification of certain of the chemical societies as regards housing and publications, and discussed the advantages from various points of view. The substance of his address is given below.*

IN the chemical world the need for a central scheme has been recognised for ten years past, and efforts have been made from time to time to give effect to it.

The societies dealing with chemistry, as indeed those dealing with other bodies of science and industry, are not wealthy bodies. Most of them possess a small accumulated capital, but the main source of income is the subscriptions derived from their members. The chief item of expenditure is the cost of their publications, the administrative expenses being comparatively small. It is only by the exercise of rigorous economy that it is possible to provide a small credit balance at the end of each year. Any scheme, therefore, which could be regarded favourably as a means of linking up the chemical societies under one roof would involve the collection of a sufficient fund by public subscription, and, hitherto, the sum regarded as necessary for this purpose has been too large to be within the sphere of practical accomplishment. The need, however, is urgent, because other nations, notably the French, are actively engaged in co-ordinating their chemical activities, and the Americans already have their "Chemists' Club" in New York. Unless, therefore, something is done, and that quickly, we shall undoubtedly be handicapped in the struggle with which we are faced.

The need for such a scheme on the part of our own Society has been emphasised by former presidents, and even twenty years ago was regarded as inevitable. The reason for this is that our apartments in Burlington House, which were given us rent free by the Government fifty years ago, have long since ceased to provide us with adequate accommodation. The other chemical societies have no accommodation other than office facilities, and for the most part make use of our meeting room. The need for new quarters is imperative.

PROFESSOR J. F. THORPE.

### The Present Scheme

Two years ago a scheme was started for housing together the chief societies and institutions connected with the scientific and technical development of the mining and metallurgical industries, namely:—The Empire Council of Mining and Metallurgical Institutions; the Institution of Mining and Metallurgy; the Institution of Mining Engineers; the Iron and Steel Institute; the Institution of Petroleum Technologists; the Institute of Metals; and the Institute of Fuel. The idea was to house these bodies under one roof in much the same manner as had already been accomplished by the Civil and by the Mechanical Engineers. In June of last year it was considered that the scheme could not be complete and effective without the inclusion of the chemists, and the Councils of the Chemical Society, the Society of Chemical Industry, the Institution of Chemical Engineers, and the Institution of the Rubber Industry, were approached to collaborate. Each Council agreed to join the scheme on the understanding—(1) That the money asked for by public subscription was forthcoming; (2) that adequate accommodation was provided. It was agreed to appoint three members from each Council to serve as a committee, the function of which was to prepare plans and formulate a scheme for the provision of a "Chemistry House."

The original plan provided for the occupation of three-fifths of a site situated in Victoria Street, Westminster. The site is the property of the Ecclesiastical Commissioners, who are prepared in principle to grant a long lease at a ground rent which is within the capacity of the constituent societies to pay. As soon as the chemical group signified their intention of participating in the scheme, it was agreed that the whole site should be taken up, the two-fifths remaining over from the original scheme being assigned for the purposes of the chemical group, and becoming therefore the "Chemistry House" of our requirements. The approximate cost of acquiring the existing lease of the site, which has twenty-two years to run, and of erecting a suitable building thereon has been estimated, after careful inquiry, at £325,000. This sum, does not provide for furnishing the new building, so that it has been agreed to issue an appeal for £350,000. In other words, two-fifths of the sum, or £140,000, will have to be provided by the chemical group as its share towards the total cost. It has been arranged that the ground rent shall be paid by each society contributing yearly an amount equal to but not more than it pays as rent for its present premises.

### The Available Accommodation

The total "carpet" area available in the new building will be approximately 8,500 sq. ft. for each floor. One complete floor will be occupied by the general library and the whole of the top floor will be utilised as a restaurant and club. There will be a large meeting hall to hold 500 people in the main portion of the building, probably on the ground floor opposite the main entrance. This will leave five floors available for the societies entering into the scheme, and in the case of "Chemistry House" these floors will have two-fifths of 8,500 sq. ft., or 3,400 sq. ft. each. There will be a smaller meeting room—to hold 200—in the chemistry wing for the use of the chemical group, although the group will have the use of the larger meeting room when occasion requires. In order that the building should be occupied from the start, it has been arranged to let such space as may be available to "Tenant" societies who would hold leases for an agreed period and pay an agreed rent. Thus, in the chemical wing, the Chemical Society and the Society of Chemical Industry would each occupy one floor of 3,400 sq. ft. The Institution of Chemical Engineers requires only 1,200 sq. ft., so that on the floor occupied by this Institution there would be 2,200 sq. ft. available for the entrance hall, ante-room, and meeting room. The Institution of the Rubber Industry has intimated that it requires only 1,000 sq. ft. of space, so that the remainder of the space on this floor, together with one complete floor, or 5,800 sq. ft. in all, will be available for "tenant" societies of the chemical group. These "tenant" societies will be in every case entities directly connected with the industries represented by the constituent bodies. They may include the Association of British Chemical Manufacturers, the National Federation of Iron and Steel Manufacturers, the Mining Association of Great Britain, and other groups of the same category.

As already mentioned, one complete floor throughout the whole building will contain the general library. This library will include the libraries already in the possession of the constituent societies, and the 33,000 volumes now in our possession will be handed over to form the nucleus of the new library. In consideration of this it has been agreed that our society shall continue, as in our present quarters, to be housed rent free. In effect, our library, library committee, librarian and library staff will continue to function in the new building in the same way as they do now. The central library is, indeed, one of the chief features of the scheme. It will contain at the beginning some 70,000 volumes, exclusive of pamphlets, and will probably be augmented by some 2,000 volumes yearly.

The restaurant on the top floor will be the means by which

meetings under social conditions can be arranged. It is intended that there shall be several small dining rooms in which the existing dining clubs of the various societies can meet, leaving the larger restaurant and dining room for general purposes. The Chemical Industry Club and the Oil Industry Club have now under consideration the question of joining as "tenants." Should they decide to do so, special rooms would be provided for them on the top floor. The Clubs would, however, retain complete autonomy and would be "private" in the sense that only those persons whom they decided to elect as members could use their premises.

### The Financial Problem

The problem of raising the necessary money causes some anxiety in view of the present great depression of industry and the incidence of high taxation. In any case, the general appeal cannot be launched until after the budget. We must look to the industries concerned to provide the greater proportion of what we require. When the general appeal is issued it will contain a list of definite promises amounting to £130,000, including some munificent personal donations, such as £10,000 from Mr. Robert Mond, £1,000 from Mr. Emil Mond, and £1,000 from Sir Robert Hadfield.

A petition was sent to the Chancellor of the Exchequer asking for a Treasury contribution, and a deputation waited on the Financial Secretary. The answer was "non-possumus," although sympathy was expressed with the object in view.

In my presidential address last year, I called attention to the advantages enjoyed by the American nation in having but one chemical society which could speak and act for chemistry as a whole. It is not my intention to suggest that any such system as that found in the United States is now applicable in this country, because there is no doubt that the principle of combined effort, although admirable and effective in certain directions, contains features which are not altogether desirable. Partial de-centralisation is often more effective than complete centralisation. For example, it would be undesirable and, indeed, impracticable to have the same president, officers and council of the Chemical Society and the Society of Chemical Industry. Any such step would tend to throw the control of the combined societies into the hands of salaried officials, and many of us feel that so long as we can get competent men able and willing to give the time to act in honorary capacities it is desirable to do so.

I would suggest, as a first step, that meetings of the four constituent bodies forming the chemical wing of the new building, namely the Chemical Society, the Society of Chemical Industry, the Institution of Chemical Engineers and the Institution of the Rubber Industry, should be open to all members of those societies and institutions. Such a proposal applies also to those "Tenant" societies who intend to use the chemistry wing. In the provinces, where there are not so many meetings, it would be necessary to arrange composite programmes.

### Publications and Membership Fees

It may be assumed that one of the chief reasons why a person belongs to one or more of the chemical societies is to obtain their publications. In my opinion, steps should be taken to ascertain whether it might not be practicable to rearrange the publications of the two societies in the following way :—

(1) Chemical Transactions. To contain the Transactions of the Chemical Society and the Transactions of the Society of Chemical Industry in those cases where no elaborate illustration of plant or apparatus is required (published monthly).

(2) Abstracts A and B published together.

(3) A publication on the lines of "Industrial and Engineering Chemistry," to contain the Transactions of the Chemical Society and of the Society of Chemical Industry in those cases where elaborate illustration of plant or apparatus is required (published monthly).

(4) "Chemistry and Industry"—the news edition—(published weekly, containing the Proceedings of the societies).

The object to be achieved is the unification of our chemical publications by bringing together under an editorial board the publications of two, and possibly more, constituent societies and to include with these such outside publications as circumstances may permit.

For many years to come there would be the following classes of members :—

(1) New members who must join both societies at a composite fee of, say, £3 10s. annually.

(2) Old members of the two societies, who would continue to pay (*ex gratia*) their present contributions to both societies.

(3) Old members of each society, who would continue to pay their present contributions as members of each society, and remain such unless they signified their desire to become joint members, when they would pay the composite contribution of £3 10s.

Those who decided still to remain members of each society would continue to pay the subscription required by each society, but such members would only receive, free of charge, those publications which each society regarded as adequate.

If, therefore, this scheme is workable actuarily, and is agreed to by the societies concerned, it means that after the lapse of, say, thirty years, membership would be confined to Class 1 only, and the two societies, while having their own president, officers and council, and thus retaining complete autonomy as regards organisation and finance, would have a common membership and joint publications. The scheme must be examined carefully by an actuary, but it is thought that the loss of revenue, due to the composite subscription, would be more than compensated for by the increase of membership due both to new members joining and to those old members of Class 3 who elect to become joint members.

There is undoubtedly a strong feeling among members of both societies that the time has now come to close, in some measure, the break made in 1881. If that feeling is real, and if strong opposition is lacking from either side, we shall achieve the object in view and bring about a union which circumstances now favour, and which, in the opinion of many of us, is in accordance with the best interests of the two societies and of chemistry generally.

It will probably require twelve months' work on the part of the joint committee to elaborate all necessary details and explore every avenue leading in the desired direction, but let us be ready, when the fiftieth anniversary of the foundation of the Society of Chemical Industry occurs next year, to put forward a well-conceived and agreed plan of amalgamation which can be put into operation at once.

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## Atomic "Numbers" Replacing "Weights"

### American Chemist's Views

A NEW system of atomic relations in the known elements has been formulated as a result of recent discoveries regarding th structure of atoms. In a Research Narrative issued by the Engineering Foundation, Dr. Arthur A. Noye, Director of the Gates Chemical Laboratory, California Institute of Technology says that atomic "numbers" have replaced atomic "weights" as the basis for the latest periodic charts and tables of the elements.

"It was only about a century and a half ago," according to Dr. Noyes, "that, largely through the researches of Lavoisier, the true nature of the more important elements of which all material things consist was established. Scientists have recently concluded from the study of the structure of the atom that the total number of elements in the universe is probably ninety-two. Of these, eighty-nine or perhaps ninety are now known. Half a century ago about twenty of these, including the radio-active elements, the inert gases, and several of the rare-earth elements, were still undiscovered. Chemists were excited near the end of the last century by the discovery of five of the inert elementary gases, helium, argon, neon, krypton, and xenon, and soon after by that of radium and other radioactive elements. As the number of known elements grew, certain relationships in their properties were observed that suggested a natural grouping and a common origin. In 1868 Mendeleeff, the Russian chemist, constructed a chart arranging the then known elements in periods of eight, though at that time there were numerous gaps. This indication of missing elements led to the discovery of a number of them, and the system made possible a remarkably exact prediction of their physical and chemical properties.

"Recent discoveries in regard to the structure of the atom have led to the construction of new periodic charts and tables based on the atomic 'numbers' instead of the atomic 'weights'; and in these charts, moreover, the elements are arranged in two short periods of eight, followed by two long periods of eighteen, then by one of thirty-two elements and finally by an incomplete series of seven elements."

# Society of Dyers and Colourists

## A Group of Manchester Papers

A MEETING of the Manchester Section of the Society of Dyers and Colourists was held on Friday, March 21, Mr. G. E. Holden, M.Sc., F.I.C., in the chair. A number of short papers was read by members.

### Effect of Swelling Agents on the Creasing of Artificial Silks

Mr. A. J. Hall, B.Sc., F.I.C., read a paper on "The Effect of Swelling Agents on the Creasing of Artificial Silks," in which he dealt particularly with the action of phosphoric acid, sulphuric acid, and caustic soda on viscose silk. In all practical industrial operations, he said, viscose was more or less subject to swelling agents; even simple boiling and treatment with alkaline solutions led to swelling. An attempt had been made to ascertain whether such treatments had any determining effect upon the creasing properties of the fibre. As a matter of fact, such treatments seemed to have very little effect upon the creasibility of viscose silk.

### Preparation of Artificial Silk and Cotton Unions for Printing

Mr. J. R. Hannay, F.I.C., dealt with the preparation of artificial silk and cotton unions for printing. He pointed out that probably the most difficult problem which the printer had to face in the preparation of such cloths was to obtain a satisfactory white. The artificial silk yarn was usually in the weft of dress cloths and could be got into a satisfactory state for printing by a simple soap scour. The cotton warp, on the other hand, could not be readily whitened if a long-continued boil was ruled out. The usual custom was to compromise between the best treatment for the artificial silk and the best treatment for the cotton. When the goods were to receive a coloured discharge pattern on a dyed ground, it was possible to produce satisfactory work by scouring with soap and mild alkali and subsequent chemicking and washing thoroughly. If, however, it was desired to produce light patterns in bright colours on white, the white obtained by such a method was not satisfactory, and the better the quality of the cloth the more difficult it became to obtain a good result. In the more expensive cloths the warp was often composed of high-class Egyptian yarns and these often appeared darker in colour after a scoured bleach than before.

These good cloths, when woven from high-grade viscose silk and Egyptian yarns, withstood an ordinary single kier boil bleach without unduly weakening the fabric, and the white obtained in this way was quite satisfactory. Unfortunately, such a bleach so thinned the handle of the cloth that it was not easy to obtain a satisfactory finish. Mr. Hannay suggested that, bearing in mind all the literature that had been published concerning the difficulty of controlling the ageing of viscose, it was highly probable that from time to time the printer received batches of cloth containing artificial silk which had been manufactured under conditions which rendered the regenerated cellulose much more liable to attack by the ordinary process chemicals than was usually the case. Mr. C. Siebert (Du Pont Co.), in a recent address to the American Association of Textile Chemists and Colourists, had stated that for several years past special effort had been directed towards ascertaining the cause of the varying affinity of the viscose type of rayon for dyestuffs. It was interesting to observe that the consensus of opinion was that it was due to a multiplicity of uncontrollable variables during the course of manufacture. He suggested that the printer should be informed of the source of the silk in all cloths sent to him for processing, and that the risk involved in processing low-grade art silks should be shared by all the parties interested in the handling of it.

### Action of Certain Acids on Cellulose

Miss Eva Hibbert, M.Sc.Tech., read a communication respecting the action of certain acids on cellulose. A search for information upon the subject was prompted by some observations recorded in the Society's Journal in 1929, and Miss Hibbert stated that she thereupon directed her attention to the behaviour of phthalic and some other organic acids in regard to cotton. It had been shown that phthalic acid was formed when purpurine was exposed to light on cotton. F. Scholefield and Dr. Goodyear had also observed the formation of phthalic acid by the fading of the vat dyestuff Anthra Yellow G.C., while Hancock had noticed the formation of considerable amounts of oxalic acid in the oxidation of aniline. Further, Haller claimed to have detected phthalic acid as a product of light fading of a simple azo colour. If a solution of phthalic acid was dried into cotton at the ordinary temperature of 15° C., and in the absence of sunlight, the cotton when washed and dyed in methylene blue showed no increased affinity for the dyestuff, but if it was exposed to sunlight, before washing, the fabric showed a slight but definite affinity for methylene blue depending in extent on the time of exposure. By comparison with oxalic acid the effect was produced much more slowly, and it was now observed to be the fact that the action of oxalic acid on cotton could readily be brought about by the action of light. Although it was known that oxalic acid in aqueous solution decomposed under the influence of light, and it had been shown by Knecht that oxalic acid solution, when dried into cotton, caused it to become tender and to acquire an increased affinity for methylene blue, the production of the effect under the influence of light, or its great acceleration by this influence alone, did not appear to have been recorded. The action commenced when cotton which had been steeped in oxalic acid solution became dry and could readily be observed after five minutes' exposure to bright sunlight. As indicated by methylene blue absorption, the effect of exposure to sunlight for half an hour was considerable. It might be due to the heating effect of the sunlight on the cloth, but that did not detract from the interest of the observation. Up to the present time, Miss Hibbert stated, she had not been able to make tensile strength determinations of cotton impregnated with oxalic acid and exposed to sunlight.

### Coupling of Diazo Compounds with 2-Methoxy-3-Naphthoic Acid

Dr. F. A. Mason, M.A., F.I.C., and Mr. G. B. Jambuserwala contributed a note upon the coupling of diazo compounds with 2-methoxy-3-naphthoic acid. The authors of the note stated that until 1914 it was generally assumed that diazonium salts would not couple with the alkyl ethers of phenolic substances, but K. H. Meyer, A. Irschik, and H. Schlosser showed that by acting upon various phenolic ethers in glacial acid solution with the salts of diazotised amines, such as dinitraniline, coupling took place, the product being usually a mixture of the methoxy-hydroxy dyestuff. Two explanations had been advanced to account for the demethylation: (1) that there was addition to the double bonds to form a product that might then split off either methyl alcohol or water to form respectively the unmethylated or methylated dye respectively, or (2) that an oxonium salt was first formed which might also split up in two ways. At all events, whatever was the true explanation the fact remained that under the somewhat drastic conditions employed coupling did occur with phenolic ethers leading to complete or partial demethylation.

### Mounting of Textile Fibre Sections

Mr. J. M. Preston, B.Sc., A.I.C., gave an interesting account of recent research work in regard to the mounting of textile fibre sections for examination under the microscope and the ultimate preparation of micro-photographic slides. The work described was of a specialised type. It was shown that the preparation of cross-sections of rayon was one of the best means for determining or diagnosing the quality of such a fibre and of enabling the manufacturer to be sure of the quality of the material he was employing. The refractive index of such a fibre was of the utmost possible importance from the point of view of the practical microscopist, and for the average cellulose fibre it was about 1·52. If, therefore, such a fibre was mounted in Canada Balsam, which possessed practically the same refractive index, the fibre almost disappeared from view when examined under the microscope, though if any foreign matter was present either in or upon the fibre it was naturally shown up very clearly. If the fibre was placed in an aqueous solution it would swell considerably and a totally different image was presented from what would occur when the fibre was dry. A point to be remembered was that cellulose acetate fibres were soluble in organic solvents.

# Catalytic Chemical Reactions under High Pressure

## A Discussion among Research Experts

*A meeting of the Royal Society was held at Burlington House, London, on Thursday, March 20, for the purpose of discussing theories of catalytic reactions at high pressures. It was attended by many eminent scientists who have devoted considerable attention to reactions of this type. Sir Ernest Rutherford (President) was in the chair.*

PROFESSOR GILBERT T. MORGAN opened the discussion with a brief review of processes which have been developed. The study of catalytic reactions under high pressure, he said, began with the systematic development of organic chemistry, and more especially in connection with the preparation of intermediates required in the production of synthetic colouring matters. Discussing the general use of pressure in chemical synthesis, he said it was employed as an aid to chemical reactions, in the first place (in the older processes), because it diminished the volatility of chemical reagents, thus retaining them in the liquid phase even when the chemical reactions involved took place at temperatures above the boiling points of these reagents under atmospheric conditions ; and, secondly, it brought about a greater concentration of gaseous reagents, thus facilitating their interaction, especially in those cases where chemical change was accompanied by a decrease in volume of the gaseous phase. By employing a catalyst, it was often possible to avoid unduly high temperatures.

### Catalysis and Pressure Reactions

In his survey, which referred exclusively to pressure reactions facilitated by catalysts, he discussed (1) catalytic pressure reactions with volatile liquids ; (2) processes involving the concentration of the gaseous phase ; and (3) high-pressure catalyses involving liquids and solids. Examples of each type of reaction were given. In the second category he referred to the methanol synthesis and discussed the work of various experimenters on the synthetic production of liquefiable hydrocarbons and oxygenated organic compounds by passing mixtures of carbon monoxide and hydrogen over heated catalytic reagents under high pressure.

In the course of the work on catalytic reactions under high pressures, which was begun at the National Physical Laboratory at Teddington in 1926, a study of the methanol syntheses was made. (A preliminary account of the early experiments was communicated to the Society of Chemical Industry in 1928.) With a catalyst prepared either from normal zinc chromate, $ZnO, CrO_3$, or from the basic salt, $3ZnO,CrO_3$, working at 420 deg. under a pressure of 200 atmospheres at a rate per hour of 2,000 litres of gas (N.T.P.) through 60 cc. of catalyst, the hourly output of organic products was about twice the catalyst volume. The liquid obtained was homogeneous : it contained 95 per cent. of methyl alcohol, 1 per cent. of higher alcohols and 4 per cent. of water. The addition of alkaline substances to the zinc chromate catalyst favoured the formation of higher alchols. Then, to the methanol catalyst (zinc chromate) varying proportions of cobalt chromate were added, with the result that, although methyl alcohol remained the predominant constituent, yet higher alcohols, including ethyl alcohol, were produced in appreciable quantities, together with small amounts of aldehydes. By the use of mixed cobalt catalysts also, containing copper, zinc, chromium or manganese, alcohols in addition to methyl and ehyl alcohols had been identified, viz., *n*-propyl, *n*-butyl, and isobutyl. So far all the alcohols detected were primary alcohols. Aldehydic products had also been identified ; these were formaldehyde, acetaldehyde, propaldehyde and *n*-butaldehyde. There was also indirect evidence of the presence of aldehydals, $R.CH(OX)_2$, the ortho-ethers of the aldehydes.

### Mechanism of Methanol Synthesis

As to the mechanism of methanol synthesis, he said that F. Fischer and Tropsch, as a result of their work on the hydrogenation of carbon monoxide, using an alkalised iron catalyst, had suggested that the oxygenated products were formed by the synthesis of methyl alcohol, followed by the direct addition of carbon monoxide to this alcohol, with production of acetic acid from which acetone was formed by loss of carbon dioxide. This scheme accounted for the presence of acids, ketones, and higher alcohols. Zinc formate, on heating, decomposed into zinc carbonate, formaldehyde, methyl formate and methyl alcohol. Under the conditions of the methanol synthesis, zinc formate might play the part of an unstable intermediate compound which was continually being regenerated and decomposed.

Discussing the formation of the higher alcohols and aldehydes by repeated aldolisation, he said the aldolisation hypothesis accounted for the products hitherto isolated, but it also postulated the transitory existence of intermediate hydroxyaldehydes and glycols, which had not so far been detected. These substances might, however, be transformed by dehydration into unsaturated aldehydes and alcohols which would speedily undergo hydrogenation to saturated aldehydes and alcohols. If substantiated by further experiment, this aldolisation hypothesis brought the synthesis of homologous alcohols by high pressure catalysts into line with the transformations following on photosynthesis which took place through the agency of living organisns (bacteria, yeasts, moulds and the green plant). With more efficacious catalysts and less elevated temperatures, one might anticipate that this analogy would become increasingly closer.

### Advantages of Pressure

PROFESSOR W. A. BONE said that the chief advantages accruing from the use of pressure in connection with reversible chemical interactions was not merely to hasten the attainment of equilibrium but also in changes involving diminution in the number of molecules to cause the equilibrium to shift at a given temperature in that direction ; for while an increase in temperature invariably shifted the equilibrium in an endothermic direction, an increase in pressure usually had an opposite effect. Hence, by imposing pressure upon temperature, we were able to secure both the speeding-up effect of the latter and to counteract its unfavourable influence upon the equilibrium proportion of the exothermic product. By super-adding a catalyst, not only was the change further accelerated, but in some cases also a new qualitative result might be induced. Therefore, by experimentally studying catalytic change in gaseous systems we had not only to determine variations of equilibrium with both pressure and temperature, but also to ascertain the "directive influence" (if any) of various possible catalysts. As regards the latter we suffered from the present unsatisfactory and chaotic state of knowledge concerning the action of catalysts, which was certainly much more complex than our theorists supposed.

### Experiments at Imperial College

Referring to the methanol synthesis, he said that Dr. D. M. Newitt and Mr. H. W. Strong had carried out experiments at the Imperial College laboratories to determine the equilibrium conditions. They had employed two independent experimental methods, *i.e.*, a static and a flow method respectively, and in each case had approached the equilibria from both sides, *i.e.*, from both the synthesis and the decomposition of methyl alcohol, whereas the work of previous experimenters was open to the criticism that in each case the equilibrium had been approached from one side only. In the Imperial College experiments, using a suitably reduced $3ZnO.Cr_2O_3$ catalyst to which 0·5 per cent. copper nitrate had been added, a temperature range of 280° to 338° C., and pressures between 60 and 100 atmospheres—conditions under which a mixture of one volume of carbonic oxide and two volumes of hydrogen was found to produce methyl alcohol to the practical exclusion of other products—and at each experimental temperature approaching equilibria from both sides by each of the two methods referred to, practically identical results for the equilibrium conditions at each temperature were obtained. From the results as a whole, Kp values were calculated for every 20° C. over the range 260° to 380° C., which was the most practicable for the synthesis of a substantially pure methyl alcohol from a $CO + 2H_2$ mixture :—

| Temp. deg. C. | Kp. |
|---|---|
| 260° | $1{\cdot}2 \times 10^3$ |
| 280° | $4{\cdot}5 \times 10^4$ |
| 300° | $1{\cdot}6 \times 10^4$ |
| 320° | $6{\cdot}7 \times 10^5$ |
| 340° | $2{\cdot}9 \times 10^5$ |
| 360° | $1{\cdot}3 \times 10^5$ |
| 380° | $6{\cdot}3 \times 10^6$ |

These Kp values were all considerably lower than any cor-

responding values either calculated or experimentally obtained by previous workers.

Taking 200 atmospheres as a practical working pressure, and 600° K (327° C.) as temperature, according to Newitt and Strong's determinations, the partial pressure of the three components of the equilibrium mixture $CO + 2H_2 \rightleftharpoons CH_3OH$, would be :—

$$CO = 54{\cdot}5,\ H_2 = 109{\cdot}0 \text{ and } CH_3OH = 36{\cdot}5 \text{ atms.}$$

The correct determination of Kp values in such a system was of considerable commercial as well as scientific interest, inasmuch as such values were the best criteria of the efficiency of a catalyst at a given temperature.

Mr. C. N. HINSHELWOOD suggested that it would be interesting if one could measure the actual rates of high-pressure catalytic reactions carried out at high pressures, because from those measurements several very interesting scientific points might emerge. A point of theoretical interest which might be important in some technical applications was that at very high pressures, where reactive gases such as carbon monoxide and hydrogen were used, it was probable that there were reactions going on in the gas phase as well as on the surface of the catalyst.

### Ammonia Catalysts

Mr. M. P. APPLEBY, discussing the mechanism of the reaction in ammonia catalysis, said that the ammonia catalysts used industrially consisted essentially of metallic iron. Pure iron was quite an active catalyst, but its activity fell off very rapidly indeed ; the addition of a small percentage of alumina, however, made the activity of the iron practically permanent. Potash was also a promoter. Another interesting fact was that the iron catalyst was much more active if it were formed by the reduction of magnetic oxide of iron ($Fe_3O_4$) than if introduced as metal or as ferric oxide ($Fe_2O_3$). Another point of great importance about the iron catalyst was that it was poisoned by very small quantities of oxygen or oxygen compounds. The fact that the amount of oxygen required to poison the catalyst was very small indicated that the number of active centres on the surface of the iron was probably very small. Very few of the atoms of iron present were active catalytically.

Essentially, the function of a catalyst, he continued, was to lower the energy of activation of a reacting substance, as had been shown by Mr. Hinshelwood. A calculation based on Dr. Rideal's determinations of the activation potential of nitrogen showed that to activate nitrogen electrically required nearly four times as much energy as was actually expended on the whole fixation process as carried out industrially, which was a sufficient indication of the effectiveness of the catalyst. Discussing further the activity of iron, he said that Mittasch and Frankenburger, at Oppau, by volatilising iron wires and condensing the vapour on cooled surfaces along with suitable diluents which, like the alumina in the technical catalyst, prevented the recrystallisation and coalescence of the active iron particles, had obtained very active iron which consisted very largely of active centres. This iron absorbed hydrogen in the Strichiometric ratio 1 : 1. Tungsten, which was shown by Hinshelwood to catalyse the decomposition of ammonia, was prepared similarly in a very active state.

Dr. E. K. RIDEAL discussed experiments which are being carried out to determine the factors which brought about the increased activity of catalysts, and he pointed out that absorption of gases was not the only criterion of catalytic behaviour.

Mr. S. J. GREEN suggested that perhaps the best hope of obtaining answers to the questions as to how to find a catalyst, and by what course of action it achieved its results, lay in closer co-operation between chemists and physicists. He suggested also that our next theory of catalysis would correlate surface structure and chemical action, and commended this direction of approach to Professor Bone and Mr. Hinshelwood in connection with their observations on surface action.

## Society of Glass Technology

MEETINGS of the Society of Glass Technology were held at Stourbridge last week under the chairmanship of Mr. Herbert Webb. Papers were read by Mr. G. V. Evers, on "Notes on the Manufacture of Refractory Materials in America" ; by Dr. J. H. Partridge on "Glasshouse Refractories : A Study of Corrosive-Resisting Properties" ; and by Mr. L. C. Gough, on "Some Practical Results with Sillimanite for Glass house Refractories."

## Paint and Varnish Research Station

### Laying of Foundation Stone

IN the presence of members of the Council of the Research Association of British Paint, Colour and Varnish Manufacturers, Mr. S. K. Thornley, the president, on Friday, March 21, laid the foundation stone of a large extension of the premises of the Research Station at Waldegrave Road, Teddington.

Those present included Dr. J. Vargas Eyre (Distillers Co.), Dr. J. J. Fox (Government Laboratory), Mr. S. R. Hadfield (Hadfield, Ltd., Merton), Dr. L. A. Jordan (Director of the Paint Research Station), Mr. C. A. Klein (Associated Lead Manufacturers), Dr. H. Houlston Morgan (Naylor Brothers), Mr. P. Murray (Berger, Ltd.), Mr. B. B. Murdoch (Winstone, Ltd.), Mr. A. B. Shepherd (British Oil and Cake Mills, Ltd.), Dr. R. E. Stradling (Director of the Building Research Station, Watford), Mr. J. A. F. Wilkinson (Royal Arsenal, Woolwich), and Mr. Oliver Wilkins (Oliver Wilkins and Co., Ltd., Derby).

Before laying the stone, Mr. Thornley said that he would carry out this duty on the understanding that those present and also the rest of the members of the Research Association were whole-heartedly with him in the desire to see the Research Station become the scientific centre of the industry. "Already," he said, "we have had sufficient experience of the working of the Research Association idea on the utilisation of existing knowledge and the discovery of new knowledge to know that it was well worth while." This work damaged no one, and was to the advantage of everyone. Co-operative research was undoubtedly a valuable, if not the only convenient, means for most people to participate in the inevitable scientific advance. The present building extensions were an indication of the need for the Association ; in fact, he was convinced that the Paint Research Station was indispensable to him as well as to many others.

## Roburite and Ammonal, Ltd.

### Petition by Nobel Industries to Acquire Shares

MR. JUSTICE LUXMOORE, sitting in the Chancery Division, on Tuesday, had before him a petition by Nobel Industries, Ltd., to give notice to those shareholders of Roburite and Ammonal, Ltd., who had dissented from or not consented to a scheme involving the transfer of shares of Roburite, Ltd., to Nobel Industries, or who had failed or refused to transfer the shares, on the petitioners' desire to acquire them.

Mr. Lionel Cohen, K.C., for petitioners, stated that it had been impossible to find the holders of shares affected. There were altogether 11 holders of 45 preference and 335 ordinary shares affected. Notices had been sent to their various addresses, but they had been returned undelivered. The Roburite Co. was incorporated in 1891 to manufacture explosives. Its capital was £140,840, of which £62,500 was in preference shares (of which 51,295 had been issued), and £78,340 in ordinary shares, all issued. The preference shareholders were entitled to a fixed cumulative dividend of 10 per cent., and the ordinary shareholders to a 20 per cent. non-cumulative dividend. The company was incorporated under the name Roburite Explosives, Ltd., and it changed its name to the present one in 1913. Its offices were at Imperial Chemical House, Millbank, London. Nobel Industries had since been amalgamated in Imperial Chemicals, and he was told that the ordinary shareholders received £3 per share, and the preference shares were paid out at par. The capital of Nobel Industries, which was incorporated in 1908, was £18,000,000.

His lordship said the application was made under the Roburite-Nobel scheme, and he could not go beyond that.

Mr. Cohen said that 99 per cent. of the shareholders had accepted the offer.

His lordship said that did not affect the position of the man who had refused, and his rights had to be considered.

Mr. Cohen said the offer made on the formation of Nobel Industries, Ltd., was, apart from a cash payment, to give 1⅛ Nobel preference shares for each Roburite preference share, and one Nobel ordinary for each Roburite ordinary share. His lordship would probably prefer to direct a cash payment, so that if the holders of the shares ever did turn up they would have the option of having cash or buying shares.

His lordship authorised the issue of the notices to the shareholders concerned, and fixed the purchase price at £2 17s. for ordinary shares, and £1 10s. 8d. for the preference shares.

# Overseas Markets for British Chemicals

## Opportunities for Trade and Development

In the matter that follows, contributed and collected from many sources, some idea is conveyed of the large opportunities still open to those, whether manufacturers or merchants, who are interested in chemical export trade. The Board of Trade returns for the whole of last year indicate a steady recovery and expansion, the more promising because of its slow and cumulative character. The figures for the first two months of this year confirm the confidence inspired by last year's results. The upward tendency of exports, combined with the downward tendency of imports, suggests the need of sustained attention to requirements overseas and of persistence in the policy of publicity and salesmanship that shows such satisfactory returns.

Once, again, it is desirable to draw attention to the conditions of successful marketing in overseas lands. These are very well set out in the interim report of the Committee on Education for Salesmanship, some extracts from which are published in this issue. The first condition—the quality of the product offered—is almost a commonplace in relation to British goods. It is taken for granted in virtually every market of the world. But it has come to be realised that, with increasing competition from other quarters, it is not enough merely to produce goods of the highest quality; efficient production requires to be supported by equally efficient publicity and salesmanship. The latter branches of work are fortunately receiving immensely greater attention than was formerly the case, and if this policy is continued, there is every reason to look for satisfying results.

In the following articles and notes will be found much useful information relating to overseas markets, in which there is scope for a still larger introduction of British chemical products, engineering plant, etc.

# British Marketing Methods Overseas

## Education for Salesmanship

*While giving due credit to individual firms and industries whose marketing methods are as efficient as any in the world, the interim report of the Committee appointed by the Board of Education on Education for Salesmanship makes a number of important and useful suggestions as to how British firms in general can further develop overseas trade by studying markets and the choice and training of their salesmen.*

In interpreting our instructions, state the committee, we have regarded Salesmanship in its widest sense as covering, not merely the work of the commercial traveller and of the salesman behind the counter, in the showroom, or on the exhibition stand, but the whole art of finding, catering for, and developing markets for the products and services of our manufacturers. Salesmanship, as we understand it, is the basis of all commerce, the first and last object of which is to market goods or services to the mutual profit and lasting satisfaction of buyer and seller. Education for salesmanship is therefore education for commerce on its creative, organising, and executive sides.

A matter which has an encouraging aspect is that, apart from a recognition of the high standard of British goods, there is a definite preference shown by a number of countries for trading with British exporters. This may be partly explained, in some cases, by racial and cultural sympathies, and in others by the investment of British money in foreign railways and other public works; but to no small extent it is due to a liking for British business methods. One witness says of the Turkish market: "The reputation for reliability enjoyed by British goods, and the tradition of fairness and scrupulous observance of their contracts built up by British firms, constitute a most valuable asset." Similar evidence is volunteered by witnesses in several other countries, and there is no doubt that this fundamental principle of sound and successful trading is widespread.

### The Salesman

As we look at it, the report continues, every member of a firm, of whatever grade, who is concerned with the marketing side of the business, or is in a position to assist in (or to hinder) the achievement of the ultimate aim of its operations, namely, the enduring satisfaction of the customer, is, to that extent, a salesman, though he may be employed in the factory, warehouse, or office, and have nothing to do with the actual selling transaction. One of our witnesses says: "The most important salesman is the head of the firm"; and we agree to the extent, at least, that the initiation, organisation and vigilant maintenance of the firm's sales policy must be the primary and constant concern of the principals. Our evidence shows that British salesmen are often not as well equipped as they should be for the difficult and important work which they have to perform. The deficiencies which are brought to our notices are, we believe, often due to faulty methods of selection, inadequate training, inadequate remuneration, and lack of direction and support from headquarters. For none of these is the employee in any way responsible. Several of our witnesses, as was to be expected, express opinions which are very favourable to the individual British salesman.

As regards the social qualities of the salesman, tact and adaptability are essential as ensuring that the salesman will quickly conform to the usual standards of intercourse and easily make friends in any country in which he finds himself. The need for courtesy and for a certain degree of responsiveness, even to strangers—the importance, in a modern phrase, of being "a good mixer"—is emphasised by a large number of witnesses from very different countries, both new and old. One witness says: "The typical British character of reserve, self-consciousness, reticence, admirable in many other ways, is not the equipment for service in South America." It is worth remarking that very frequently an intelligent acquaintance with current local events (for which a knowledge of the language of the country is essential) is a direct aid to business. This would be true, for example, of Italy.

### Language Requirements

It is always desirable and often essential that the salesman should have a good knowledge of the language, written and spoken, of the country where he is stationed. In certain countries, apart from the British Empire, it is true that English will carry the trader a long way; but even in Denmark and Norway, which are the two outstanding examples in Europe, a knowledge of Danish and Norwegian, particularly the latter, will be found very useful. In other parts of Europe the possession of one or more foreign languages is essential to full efficiency. It is obvious that in each of the larger countries the salesman should know the language, French, German, Italian or Spanish as the case may be. As regards the smaller markets, we have received a good deal of interesting evidence, of which the following are examples: "He (the salesman) will obtain an order from a Greek better by speaking Greek, than he will by speaking English or French, even if the Greek knows either or both of these languages." "A working knowledge of German and French is desirable in Sweden." Though spoken English "will usually carry one further than French and usually about as far as German . . . it would often be of advantage to be able to read Swedish; documents, newspaper cuttings, etc., could then be forwarded in the original from Sweden, and it would be found much easier to keep in touch with the market." As regards Switzerland, "catalogues in English are practically useless," and "the desirability of corresponding with Swiss firms in French or German for preference cannot be too much stressed." Firms trading with Belgium should have catalogues printed in French (and, in certain districts, Flemish).

As regards other parts of the world, a large number of Turkish firms understand English, but their correspondence is apt to be somewhat perplexing, and in such cases it is very desirable to be able to correspond in French, which is also a necessity in Egypt.

The salesman, once he is stationed overseas, must of course devote his energies constantly to a study of his market or markets. There is reason to think, however, that in the Far East, and possibly a few other parts of the world, the young salesman will find it more difficult to equip himself in this way than he would, for instance, in Europe. The Hong Kong Chamber of Commerce says: "There is at present too great a tendency for salesmen to stick to the office desk instead of getting out to the various markets, studying the language, making friends with prospective buyers, and becoming acquainted with local conditions. Lack of knowledge of Chinese life and language has placed British merchants at a disadvantage as compared with other competitors, more particularly the Japanese." It is possible that this defect is partly due to a social tradition which may tend to isolate the members of a British community in Oriental countries. The handicap which it imposes is obvious.

### Study of Markets

As to the study of markets by firms, a witness resident on the Continent says: "A United Kingdom manufacturer should make up his mind, by careful preliminary research work, as to whether the market is worth trying for. If not, he should refrain from wasting time and money and prejudicing opinion against British methods." A witness from a recently constituted state in East-Central Europe admits the marketing difficulties occasioned by the creation of these new states, but observes that Germany and other countries have adapted their trade policy to the present conditions. The inadequate study of the local market by the British exporters is commented upon by Chambers of Commerce as far apart as Pietermaritzburg, Hong Kong, Lagos, Toronto and Sydney. The last named says: "In many cases representatives of British firms are only allowed six months, during which they have to visit all Australia, New Zealand, India and the East. Quite recently one of these representatives could only spend three days in Sydney, a city with a population of 1,080,085, and containing many businesses with a capital of £1,000,000 or more."

Though in certain markets and for certain branches of trade the evidence shows that the British salesman is usually of an excellent type, such evidence is by no means universal. There is, in fact, ample support for the opinion that "in order to attract the right kind of man, an endeavour should be made to raise the status of the salesman." Thus one witness says: "British firms do not in my experience attempt to secure men of the really high calibre required for this (a salesman's) work."

It is emphasised that the ideal representative in a foreign market is one who has the standing of a principal in the firm which he represents, and as this is obviously not always possible, then a representative of the calibre and attainments corresponding to a principal is desirable if British trade overseas is to make progress in the face of modern competition. As showing that this standard is far from being generally maintained or appreciated, it is disquieting to learn from one source that English employees are often obliged to accept service with American firms because of the higher salaries offered; and from another in the East that "generally speaking the best type of British salesman, where both social standing and ability are concerned, has represented American firms."

### Visits by Principals

It is regarded as essential that the principals should pay frequent visits to all the important markets of the firm. An intelligent selling policy cannot be maintained at headquarters unless there is first-hand knowledge there of the market and its developments.

The need for continual adjustment to the needs of the individual market is stressed by the Uganda Chamber of Commerce: "His (*i.e.*, the British manufacturer's) salesman should go out with the idea to recommend to his chief what the country *wants*, rather than try to force on the country what his firm is willing to sell. Germans, Frenchmen, Austrians, Americans and even Swiss, have come to Uganda not only willing, but anxious to provide what the market demands.

There is a very strong and healthy aversion in this country from doing anything which might lower the reputation for quality enjoyed by British goods, and we think it would be unwise for anyone to attempt to lay down any general rule on the subject of British firms competing in cheap lines of goods of a low, or comparatively low, quality. If this matter is to be considered at all, it must be in relation to a particular commodity and a particular market, but we think it right at least to draw attention to the fact that the evidence of some witnesses suggests the possibility of considerable trade expansion on these lines.

### Delivery and Packing

British exporters have been frequently criticised in the past for delay in delivery of goods, or for requiring an excessive time for delivery. Though there is reason for thinking that this shortcoming has been largely remedied in some markets, there is, to judge from our evidence, still ground for criticism. As regards the question of packing, the Association of Chambers of Commerce says: "In general, it is considered that on the whole packing methods are satisfactory, although there appears to be some room for greater attention to transport conditions. It is pointed out that strong and heavy packing for Colonial trade is not always necessary for European consignments, and it may in fact prove a distinct handicap where customs duties are calculated by gross weight."

It is of importance that prices, weights and measures should be those familiar to the customer, for example weights and measures in terms of the metric system for the continent of Europe. Evidence is invariably to the effect that British weights and measures are an intolerable nuisance to the continental purchaser, and that the labour of calculating the equivalent in the metric system is a genuine obstacle to trade.

Witnesses mention that it is frequently the practice of British exporters to quote F.O.B. British port or even ex-works, with consequent labour to the purchaser and detriment to British exports. Foreign competitors, on the other hand, normally quote C.I.F. the frontier of the purchaser's country, and apparently not infrequently prices free of all dues and charges. The Bombay Chamber of Commerce says: "British manufacturers usually quote F.O.B. prices, leaving the Indian buyer to calculate the actual cost of the goods to him. Continental suppliers are willing to meet the buyer's needs on these points and, in the last case, quote prices including all charges to the nearest port."

We agree with a witness that the ideal should be to give "the prospective customer what might be termed a 'no trouble' quotation, and thereby enable the British article to compete on level terms with its rival."

### Conditions of Sale

As regards conditions of sale, the Association of British Chambers of Commerce says that "if there be any general observation made" in the views which it has received from its constituent Chambers, "it is that there is more inclination on the part of foreign competitors to grant greater credit facilities than is the case with British exporters, and that the latter suffer by comparison in this respect." Another witness refers to the impression that exporters in other countries, and Germany in particular, give easier terms than do the British firms.

The importance of service is regarded as vital, notably in regard to machines and machinery of all types. For example, the Hong Kong Chamber of Commerce says: "Service combined with sales is important in China where the natives are reared in an unscientific environment and are not accustomed to modern industrial machinery and organisation." Another Chamber of Commerce recommends "central supply and spares depots abroad."

On the subject of publicity the Associated Chambers of Commerce of New Zealand suggest that few British firms advertise their goods sufficiently, and add that "in that respect some of their competitors, notably the United States of America, are much more aggressive." They recommend the employment of advertising agents domiciled in the Dominion who are familiar with local conditions; while, on the same point, another witness draws attention to the possible difference in the appeal which an advertisement would make to a French as against an English customer. The showing of goods at fairs and exhibitions is also worthy of closer consideration by many British manufacturers than it has generally received.

Summing up, the committee state: If we were asked what our evidence shows to be, broadly speaking, the outstanding weakness in British marketing overseas, we should answer:—A detached and insular attitude and unscientific practice—relics of the time, long past, when we enjoyed a virtual monopoly of the world's markets for manufactured goods. For this weakness (again very broadly) the remedy is mainly to be found in a policy based on the most searching study of the character and needs of the market; on close, continuous and sympathetic contact with it; and on the guiding principle that the complete satisfaction of the customer is the basis of all permanent commercial prosperity.

# Chemical and Allied Industries in Spain

## Some Observations at the Barcelona Exhibition

*A correspondent who has made a study of the Barcelona Exhibition supplies in this article an interesting appreciation and criticism of the chemical exhibits, together with some notes on the chemical and allied industries of Spain.*

It is now almost a year since the International Exhibition at Barcelona was opened by the King of Spain. Since that time many people from all parts of the world must have passed through its stately avenues and admired the remarkable imagination expressed in the design of its palaces. Those who visit the Exhibition in the interests of trade will, however, look for something more than fine buildings. They will not be disappointed, for the area of 260,742 square metres occupied by buildings includes eleven large halls devoted to industry, commerce and agriculture. Two smaller sections of the Exhibition are concerned with art and sports. The principal sub-sections of the industrial exhibit include motive-power, machinery and tools, etc., organisation and industrial hygiene, agriculture, mining, industrial and applied art, and transport and communications. In addition, important sections are devoted to scientific instruments and the chemical industries. The latter is housed in the hall of electricity and motive power, which occupies a floor space of 17,000 square metres, and includes electrochemical industries, chemical materials and processes, laboratory apparatus, drugs and coal tar products.

In view of the essentially international character of the exhibition the Governments of a number of countries were offered sites on which to erect pavilions. For some unfortunate reason, this offer was officially declined in Great Britain, and the section devoted to British industry had to be organised privately. The result is that the British exhibit consists of a mere handful of enterprising firms located in a more or less obscure corner of the Exhibition. So insignificant is British representation that a number of the exhibition attendants were not even aware of its existence, and certainly it was arousing little public interest. Sir Henry Segrave's "Golden Arrow" was the main source of attraction in the early days of the Exhibition. Engineering firms are the principal exhibitors, but artificial silk, optical instruments, patent foods and road materials are also represented.

### The Chemical Exhibit

Whatever may be the reason for this state of affairs it represents a valuable opportunity lost. Germany, France, Italy, the Scandinavian countries, Switzerland, India and Japan are all represented and provide attractive exhibits. The German organisation in particular may be described as the "last word" as far as attracting the public notice is concerned, and its effect is apparent in every pavilion devoted to industries in which German goods may be used. This applies especially to the chemical exhibit, where an English name is unfortunately rare.

If the imagination of the Spanish public is to be captured by artistic design combined with ingenuity, the chemical exhibit will not succeed in doing so. As a trade display it is good, but there seems little effort to impress on the public the importance of chemistry in everyday life that is so significant of exhibitions to which we are accustomed in this country. This may account for the fact that the chemical section was almost deserted by the general public.

Paints, oils, varnishes, lacquers, dopes, mineral pigments and enamels figure largely among the chemical exhibits, and one of the paint displays includes an interesting range of blacks stable at high temperatures. Solvents also occupy a prominent position, though Spain imports a great deal of its acetone and methyl alcohol, Germany being the principal supplier, followed by the United States and Great Britain. Butanol and butyl acetate, as well as acetone, are made in the neighbourhood of Barcelona. In this district also a new refinery is being built capable of dealing with 200,000 tons of petroleum per annum.

The display of fine chemicals and drugs is mainly of foreign origin, the contribution of the Institut Pasteur being the preparation and use of anti-diphtheria toxins. Camphor is an important home product, and it will be remembered that Spanish turpentine is particularly rich in pinene. Electricity is closely associated with chemistry at the Exhibition, and special interest is attached to the electro-chemical industries in view of the recent decisions in Spanish official quarters to provide 400,000 kilowatts of electrical energy for use in industry. A "Council of Energy" was formed to develop this project, which will extend over a number of years, and it is expected that the nitrogen industry especially will benefit thereby.

### Potash and Heavy Chemicals

There is also considerable activity at present in connection with the exploitation of Spanish potash deposits to satisfy home requirements. The salt deposits of Olaz, near Pamplona, were shown in 1928 to contain potassium, and after investigations by the Government it was decided to commence drilling to a depth of 600 metres. The potash deposits of the Cardona mines are exploited by the Union Espanola de Explosivos, and these mines, which contain seams on ground-level, also produce salt at 54 pesetas per ton which is selling well. There has been some talk in official circles of steadying the price of potash by regulating its output, but it is as yet too early to judge the extent to which the Government's policy of controlling industry will be affected by recent political events.

As far as mineral acids are concerned, Spain is able to produce just sufficient for its own requirements. The chamber process is usually employed for sulphuric acid and of the annual production (900,000 m.t.,) 675,000 m.t. are used for superphosphates. Potassium metabisulphite and hydrosulphite are also produced locally, though for liquid sulphur dioxide, sulphites and bisulphites Spain has to rely largely on imports from foreign countries. Importation of coal tar derivatives is restricted, and certain of the intermediates and dyes are in consequence now made in Spain.

The productions of iron and copper sulphates, the former as a by-product of the iron and steel works, are also considerable, though 600 tons of the latter are imported per annum. The combined outputs of caustic soda and soda crystals amounts to over 60,000 tons, most of which comes from the Torrelavega company, a constituent of the Solvay group.

In 1921 the Rothschild contract with the Spanish Government for the control of the Spanish output of mercury came to an end. Prices were then fixed and published in advance, with the result that Italian competitors were able to undersell by a small margin. The whole Spanish production for each year, which incidentally is often overestimated, was therefore disposed of by tender, usually to the United States, so that a certain amount of speculation arose, with consequent fluctuations in price. According to *Die Chemische Industrie* (26 October, 1929) this was remedied in 1928, in a manner which should prove beneficial to the Spanish industry, for, as a result of an agreement between the mercury producers of the two countries, the "Mercurio Europeo" has been set up at Lausanne to control prices. Its position is strong, since almost 90 per cent. of the world's production comes under its influence.

### Chemistry and Agriculture

A few gleanings from exhibits not dealing primarily with chemicals may also be of interest. The Chilean nitrate industry must certainly be mentioned, since the whole of one small pavilion is devoted to it. This pavilion is the centre of enterprising propaganda organisation. Booklets, both popular and technical, are provided in all languages, and no matter what

crop it is desired to grow, the inquirer will find a full account of the best fertiliser to use, together with the best means of applying it and the results of experimental trials. It was reported a short time back in the Spanish press that Spain consumes 150,000 metric tons of Chilean nitrate yearly, but that if, as expected, arrangements with Chile are concluded by which the Spanish Government becomes the sole distributor for Spain, this amount should increase. On the other hand, hopes have been expressed that the development of the electrical supply referred to above will give a fillip to the synthetic nitrogen industry, and enable it to compete with Germany in the matter of prices.

The importance to Spain of agriculture in general is at once evident from the imposing exhibit (which includes foodstuffs) covering an area of 16,500 square metres. Intelligent efforts on scientific lines are being made in the study of soils, fertilisers and agricultural implements, and institutions have been founded to deal with statistics and for educational purposes. Spain is not in the position to take full advantage of scientific knowledge accumulated and published by foreign workers, for many of its problems are peculiarly its own.

The cork industry may serve as an example, for in this case Spain (with Portugal) provides 75 per cent. of the world's requirements of 188,000 tons, Algeria and France providing about 10 per cent. each. Most of this raw material goes to the United States, and it has been stated that Spain corks all the bottles of over 60 countries. The prosperity of the industry is due to the suitability of the soil and climate of Spain, but the thick and compact barks which command the highest prices in the trade are the result of patient experiment.

The mention of corks is a reminder of the importance of the fermentation industries in Spain. Spanish wines need no bush, and the average annual output of over 22 million hectolitres places Spain third in the list of wine-producing countries. It is claimed, incidentally, that of all countries Spain has the largest *per capita* consumption of wine in the world, but the lowest percentages of illnesses due to alcoholism. Beer is brewed to a less extent, but there is evidence that in the near future the production of industrial alcohol will assume considerable importance.

### Olive Oil

Finally, reference must be made to one of the most important of Spanish industries, the prosperity of which reacts closely with certain branches of chemical production—namely, that of olive oil. Spain has a rich, well-drained soil, and this in conjunction with its Mediterranean climate renders it particularly favoured by Nature for the cult of the olive. The Olive Growers' and Exporters' Federations are responsible for a small but very attractive pavilion at Barcelona, and the impression gained by the foreign visitor is that no efforts are being spared either in the matter of scientific investigation or propaganda to maintain Spain in the forefront of olive oil producing countries. As an instance it will be recollected that a short time back international prizes were offered by this body for essays dealing with certain aspects of the subject.

The results of this campaign are evident from the fact that it is only during the last few years that the output of oil from Spain has been larger than that from any other one country. In the 1927–8 season Spain was responsible for 61 per cent. of the world's production. Italy is a close rival, and the other Mediterranean lands are of less importance.

In Spain nearly 9 per cent. of the total cultivated area is composed of olive groves, Andalusia in the south being most productive though, on account of the shortage of labour, the quality of the oil is not so good as in Catalonia, where the fruit is gathered more carefully.

The advantages of olive oil for edible purposes are not greatly appreciated by the northern races of Europe. Spain's large surplus of about 340 million kg. is absorbed principally by the United States and South American countries. England takes about 3 million kg. The canning industry, notably in Norway, uses large quantities, and it may here be mentioned that the same industry has been largely responsible for the development of tinplate production in Spain.

There appears to be considerable scope for development on the engineering side of olive oil production. Numerous problems are involved in the extraction and purification of the oil, and if favourable conditions are not maintained the oil is easily spoiled. A demand for organic solvents, and the plant for their use and recovery, has been created by the process for removal of residual oil from the marc after expression of the first-quality oil. Petroleum spirit and carbon disulphide have both been used, but tri-chlorethylene is now displacing them.

### Conferences

Provision is also made at the Exhibition for Conferences. The Water Power Conference held early in the summer of 1929 proved a source of attraction for visitors from all over the world, though the Ninth Congress of Industrial Chemistry held under the auspices of the French and Spanish Societies of Chemical Industry on October 13 last was more of purely chemical interest. This also attracted numerous chemists from all over the world, among whom were Prof. H. E. Armstrong, F.R.S., Dr. Lampitt, who represented the Chemical Society, the Institutes of Chemistry and of Brewing, and the Society of Chemical Industry, and Mr. Robert Mond, who came for the Association of British Chemical Manufacturers.

The opening address on Molecular Structure in Relation to Life and Colour was one of Prof. Armstrong's typical utterances. Other papers of importance dealt with catalysis by Prof. Sabatier, petroleum by M. Serrano, and agriculture by Prof. Rocasolano. There was also a discussion on the training and education of the chemist for industry, subjects which should arouse special interest in Spain at the moment in view of the decision by the Del Amo Foundation to erect a university city in the beautiful Moncloa Park, which it is expected will be one of the finest in the world. It is to be hoped that the other papers and discussions, many of which were of great interest, will be published in readily available form for the more leisured hours of those who found counter-attractions at the time in the interesting excursions.

In conclusion, it must be pointed out that a complete survey of the growing chemical industry of Spain has not been attempted. It is merely hoped that some random observations of chemical interest culled from this important Exhibition may serve to indicate the directions in which new developments may be expected. J. G.

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# South African Chemical Trade

## Notes by a Cape Town Correspondent

South Africa now has about 33 soap and candle factories, employing nearly 2,000 workers and having an output valued at about £1,900,000, but there still remains scope for the British exporter. The bulk of the soap manufactured in South Africa is of the household and laundry type, the annual value of which is well over £1,000,000. Nearly £200,000 of toilet and other sorts of soap are produced annually, and over £40,000 of scouring varieties. The annual import of soap is worth about £110,000.

### Soap Imports

It is, perhaps, hardly necessary to remind the British soap manufacturer that the South African market is closed to all but the best brands of soap. A brief consideration of the figures above will convince all inclined to think otherwise. In South Africa, Rhodesia and South-West Africa, the British exporter will find competition keenest in the cheaper lines, in soft and saddle soaps, and in soap extracts and powders.

Imported toilet soaps are very popular in South Africa. Instead of local competition leading to a fall in these lines, the imports show a tendency to increase from year to year. These varieties represent fully 75 per cent. of the business effected in imported soaps. The Union, in fact, can be regarded as an excellent market for high-grade scented soap. All shaving soaps, creams, and powders used in South Africa, for instance, are imported.

Although France and other Continental countries share in this trade, the bulk of it is divided between Great Britain and the United States, to which it is now worth £80,000 as against the £55,000 of six years ago. There has been a similar increase in the sale of other toilet preparations and perfumery, which in 1928 was valued at £285,000, and in the course of the next few years must further increase in value. Countries outside what is generally regarded as Southern Africa also deserve attention. In Nyasaland the demand for every kind of toilet requisite is increasing steadily, and in Uganda the annual consumption of common soap alone is worth £10,000. Australia seems to be turning its attention to these markets.

The South African purchases of these soap products has a tendency to increase steadily.

Disinfectants and insecticides form another line in which the British exporter, in spite of local industries, could do excellent business. The demand for these products in South Africa is well known, and the figures illustrating increased use here hardly need quoting, but the smaller but equally keen demand in the South-West African Protectorate is rarely mentioned. The seeming small and unimportant markets will repay much closer study than is being given to them.

A word could also be said here of the desirability of keeping in touch with Government representatives in London. In this way latest information regarding tenders from various official departments will be obtainable. South Africa and the various British colonies in Africa are frequently calling for tenders for various types of chemical goods.

Larger orders for chemicals occasionally follow experiments in these countries. For this reason it is advisable for chemical manufacturers to watch the South African Government's experiment in establishing a Coal Research Institute in the Transvaal, where it is hoped to find a means of utilising the oil resources of this mineral. Uganda has also been carrying on experiments with power alcohol. If the satisfactory results of the preliminary tests are confirmed by later experiments there may be a considerable demand here for certain types of chemicals.

### A Satisfactory Line

Artificial fertilisers represent one of the most satisfactory chemical lines for the British manufacturer trading with South Africa. The more the local farmer realises that he cannot expect to get maximum returns from his soil without these aids the greater must be his purchases of imported chemical fertilisers. The most profitable variety is superphosphates, 85,518 tons of which were imported in 1928. As the figures for 1926 and 1927 were respectively 37,952 tons and 53,599 tons, it is apparent that the demand for this fertiliser is increasing rapidly.

Raw phosphates, largely for the manufacture of South African fertilisers, was next in order of demand. The figures for the three years show a progressive increase, and were respectively 29,568 tons, 56,881 tons, and 66,892 tons. As few South African phosphate deposits have been considered of sufficient value to work on a commercial basis, imports of phosphate fertilisers must increase with farming expansions in the Union.

Basic slag has been subject to fluctuations occasioning some anxiety in 1927, when the 15,981 tons of 1926 were followed by a total import of 12,688 tons, but in 1928 basic slag recovered so much that 16,049 tons were disposed of in the South African market. The demand for rock sulphur is fairly constant. For the three years the imports were 14,513 tons, 13,404 tons, and 14,140 tons.

Nitrate of soda has been subjected to the most astonishing caprices. In 1926 3,000 tons were ordered, but the following year only 27 tons were imported. In 1928 the import figures jumped up to 933 tons, but there is yet no indication of a stable demand for this chemical fertiliser. Bone manures and potash manures, and sulphate of ammonia are being used in larger amounts each year. They may all be exported profitably.

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# Cuba as a Market for Chemicals

**By S. L. B. Etherton, M.A.**

It is estimated that Cuba at present consumes about £3,000,000 worth of chemicals per annum. The following list shows the approximate amounts and values of the principal chemicals imported during 1928 and will serve as a guide to what Cuba demands.

This list does not take into account such products as concrete, rubber, leather, lubricating oils, etc. Considering that the population of Cuba is approximately 3,000,000, this consumption of chemical products is at a high level. About half is supplied by the United States and most of the rest by the United Kingdom, France and Germany.

Pharmaceutical importations, comprising cosmetics of various sorts, medicines and analogous products, take the lead. These products require much advertisement, and too much attention cannot be paid to the appearance of product and container, particularly for the Latin-American consumer. In spite of the temporary depression in the sugar circles of Cuba, the importation of these substances generally does not fall off.

Paints of various sorts are next in importance and the field for these products is good. There are, however, two paint factories in Havana already, La Compania Nacional de Pinturas S.A. and the Bredell Paint Products Company.

CHEMICALS AND ALLIED PRODUCTS IMPORTED INTO CUBA IN 1928.

| | lbs. | £ value |
|---|---|---|
| Acetic acid | 180,000 | 3,700 |
| Acetone and methanol | 642,000 | 11,000 |
| Acids, inorganic, not otherwise mentioned | 560,000 | 5,800 |
| Ammonium sulphate, phosphates and superphosphates | 75,000,000 | 242,000 |
| Anhydrous ammonia | 3,200,000 | 23,000 |
| Antitoxins, serums, vaccines | 4,800 | 4,300 |
| Biological products | 250,000 | 56,000 |
| Boric, hydrochloric, nitric and sulphuric acid, not for industrial use | 1,700,000 | 6,000 |
| Bromine, chlorine and iodine | 65,000 | 3,300 |
| Calcium carbide | 9,700,000 | 85,000 |
| Carbon bisulphide and tetrachloride | 90,000 | 1,500 |
| Chemical products in large packages or bulk | 1,640,000 | 34,500 |
| Chemical products in small packages | 1,460,000 | 76,000 |
| Citric acid | 55,000 | 3,200 |
| Colours, natural | 842,000 | 4,800 |
| Colours, artificial, with metallic base | 10,800,000 | 283,000 |
| Colours, other, artificial | 84,000 | 7,000 |
| Creoline, lysol and disinfectants | 585,000 | 6,400 |
| Dentifrices | 117,000 | 19,200 |
| Dyes, coal tar | 110,000 | 14,500 |
| Face cream | 34,000 | 5,200 |
| Face powder | 92,000 | 16,600 |
| Glycerine | 440,000 | 11,000 |
| Hydrochloric acid, industrial | 3,340,000 | 10,200 |
| Insecticides | 338,000 | 11,300 |
| Medicines, prepared | 5,700,000 | 503,000 |
| Oil, turpentine | 640,000 | 10,200 |
| Oils, essential | 106,000 | 51,300 |
| Oils, hair tonics and pomades | 53,000 | 6,000 |
| Oxalic, tartaric and carbolic acid | 176,000 | 4,430 |
| Oxide of lead for glass manufacturing | 59,000 | 420 |
| Oxides, other than lead | 7,700,000 | 44,300 |
| Paints, fine, in tubes or tablets | 46,000 | 3,600 |
| Perfumery | 75,000 | 47,300 |
| Phosphorus | 78,000 | 3,600 |
| Pills, capsules and granulated medicinal products | 326,000 | 115,700 |
| Rouge, lipsticks | 73,000 | 13,000 |
| Salts, not otherwise mentioned | 7,760,000 | 32,000 |
| Salts, organic | 99,000 | 3,200 |
| Sodium carbonate, bicarbonate and sulphate | 5,700,000 | 23,200 |
| Sodium and potassium chlorate | 1,000,000 | 9,000 |
| Sulphur | 6,400,000 | 8,800 |
| Sulphuric acid, industrial | 3,000,000 | 9,700 |
| Toilet waters and lotions | 83,700 | 11,800 |
| Varnishes | 607,000 | 25,400 |

Being mainly agricultural, there is great importation of fertilisers into Cuba. Germany sends potash, the French contribution of which may be expected to grow, and Chile supplies nitrates. However, ammonium sulphate and phosphates have a very good scope. The average annual rainfall for the island is about 50 inches, chiefly in the summer, a fact enhancing the value of a readily assimilable fertiliser. Natural fertilisers enter chiefly through the port of Matanzas, only about 10 per cent. going through Havana. About 60 per cent. of the prepared fertiliser enters through Havana, 20 per cent. through Puerto Tarafa, and 10 per cent. through Matanzas.

It is doubtful, for obvious reasons, whether adequate competition can be put up in the case of mineral acids, whereas this can be done in the organic acids.

Common soaps and soap making materials are imported on a large scale, but efforts are being made to develop soap manufacture in Cuba. The tendency is to import in bulk and to package in Cuba.

Cuba does not manufacture finished chemicals. These are mixed, compounded and repacked on the island. Much of the compounding is done by the large drug firms, among which are Droguería Sarrá, Droguería Taquechel, Droguería Johnson and the International Drug Store Company.

The importation of explosives, including matches, but

excluding side arms, is considerable, amounting to some £70,000 to £100,000.

The tariff of the island has to be studied and tariff changes require to be watched. The policy at present is to favour the importation of the raw material to be mixed and compounded by the importers, pharmaceutical houses and fertiliser distributors. Such working arrangements may readily be developed. The metric system of weights is used.

The present outlook for chemical importation into Cuba requires close attention, since credits may be curtailed, owing to depression and restrictions in the sugar business, the staple industry of Cuba. However, the United Kingdom is very fairly situated in these matters because payment may be made by the return cargo of sugar.

## Superphosphate Position in Australia

THE use of superphosphates in Australia has increased rapidly in recent years, not only for fertiliser on agricultural lands, but also in the top-dressing of pastures. In 1902 only 55,000 tons were consumed; in 1921, 375,000; in 1923, 463,000; and in 1927, 642,000. In the near future, it is thought, 1,000,000 tons will be required each year. According to estimates, superphosphates are used on 90 per cent. of all cultivated land in Victoria, South Australia, and Western Australia. In New South Wales, only about 65 per cent. of the cultivated area is thus treated.

With the growth of the fertiliser habit, agriculturists and graziers have become more and more concerned regarding the price of superphosphates. The cost per phosphatic unit of superphosphates for the manufacture of fertilisers is variously estimated at 1s. to 1s. 5d. higher in Australia than the average cost in other countries.

### Availability of Phosphate Rock

The high price is not due to the initial cost of phosphate rock, for the country is fortunate in being able to obtain very large quantities from Nauru and Ocean Island at a lower price than can be offered in other countries. The present price of Nauru phosphate rock is 40s. 6d. per ton c.i.f., and of Ocean Island rock 43s. 6d. c.i.f.

The supply of rock from Nauru and Ocean Island, moreover, is believed to be practically inexhaustible. The two islands, however, produce on an average about 500,000 tons per year. The limitation of output is due, in part, to the prevalence of westerly gales, which necessitate a rather complicated and expensive cantilever system of loading, and in part to the limited supply of labour that can be maintained on the islands. It appears improbable that for the next 10 years the output can exceed 600,000 tons per annum, although this may eventually increase to 1,000,000 tons. In 1926, Australia imported 326,000 tons of this rock, and in 1927, 558,584 tons. Although Great Britain is entitled to take 42 per cent. of the rock mined in these islands, it has taken practically none.

Australia also still purchases some rock from Morocco and Florida. Calculations have been made as to the number of cargoes which will have to be purchased from outside sources up to 1932.

### Regulations in New South Wales

All of the regulations previously made under the Fertilisers Act, 1904, have been repealed and new ones gazetted, including the following changes:

The statement which must either be affixed to or accompany each package of fertiliser must mention the percentages of nitrogen, phosphoric acid, and potash which the fertiliser is certified to contain. If it is certified to contain readily available phosphoric acid, the proportions of water-soluble phosphoric acid and total phosphoric acid must be mentioned. Where the fertiliser contains leather, horn, hair, or any substance containing nitrogen in an inert form, that fact must be stated.

Where any fertiliser has been sold, the purchaser may take samples before delivery and may (if he proposes to submit any part of the sample to an analyst) divide the sample into three parts and wrap up, mark for identification, and seal each part. He shall then deliver one part to the vendor, another to the Undersecretary for Agriculture, for the purpose of reference, and may submit the third to an analyst. The vendor also may submit to an analyst the part delivered to him: He further must be afforded an opportunity of being present at the taking of the sample.

Any statement given in pursuance of the regulations shall not be regarded as false unless on analysis it is shown that the weight of nitrogen or potash in the sample of fertiliser is less than that shown in the statement given by the vendor by more than 1 per cent. of the total weight of the sample, and in the case of the water-soluble phosphoric acid or total phosphoric acid by more than 2 per cent.

In the event of divergence of the results of analysis made for both vendor and purchaser, equal to or exceeding the percentages mentioned, the sample lodged with the undersecretary shall be submitted to a second analyst, who has not previously analysed such sample. Where any sample submitted to the Undersecretary is required by either vendor or purchaser to be analysed, a fee of 15s. will be charged for each determination. The minister may, however, reduce or remit the charge where a sample is submitted for analysis by a *bona fide* farmer or settler resident in New South Wales.

## Canadian Market for Fertilisers

### An Increasing Use

CANADA is a very good market for fertilisers and fertiliser materials. As the plant food content of the Canadian soils is slowly diminishing, farmers are realising more and more the value of fertilisers in obtaining increased yields. Both production and imports have advanced during the last few years. In 1927 over 200,000 tons of these materials were manufactured and approximately 200,000 tons imported.

The 68 Canadian, American, English and Scottish firms doing business in the Dominion in 1927 sold 169,564 tons of fertiliser in the Canadian market and exported 143,996 tons. For the domestic trade, 64,423 tons of mixed fertilisers were sold, 56,715 tons of superphosphates, 12,929 of sulphate of ammonia, 2,158 of bone meal, 2,116 of tankage, 1,021 of fish meal, and smaller quantities of cyanamide, sulphate of potash, dried blood, nitrate of lime, bone meal, whale meat and blood, natural phosphate rock, sheep manure and urea. However, considering the size of the country, this consumption is small.

Fruit-growing areas are among the chief markets for fertilisers. There has been little demand as yet for fertilisers for growing grain in the prairies, since the soil still appears to be generally well supplied with plant food. In Alberta experiments were carried out with superphosphate and in some instances promising results were obtained in wheat yield, while in other cases no increases were noted. Eventually, the Prairie Provinces may offer a market for fertilisers.

Of the 68 concerns engaged in selling fertilisers to consumers in Canada, 34 have their factories in the Dominion and seven sell from plants located in the United States; 43 are engaged in manufacturing fertilisers or fertiliser materials; and 53 sell products made in Canada and 50 imported products.

Fertiliser materials are often sold to farmers, who use them singly or mix them according to the formula that best serves their needs. The Federal Government maintains experimental farms which conduct fertiliser tests.

The kinds and amounts of fertilisers sold in Canada, except for manufacturing purposes, during the fiscal year ended June 30, 1927, were as follows:—

| | Short Tons. |
|---|---|
| Sulphate of ammonia | 6,909 |
| Nitrate of soda | 9,066 |
| Cyanamide | 606 |
| Acid phosphate | 56,716 |
| Natural rock phosphate | 91 |
| Basic slag | 12,919 |
| Muriate of potash | 12,523 |
| Sulphate of potash | 305 |
| Tankage | 2,116 |
| Dried blood | 219 |
| Bone meal | 2,158 |
| Bone flour | 139 |
| Whale meat and blood | 111 |
| Fish meal | 1,021 |
| Calcium nitrate | 175 |
| Sheep manure | 42 |
| Whale meat and bone | 24 |
| Urea | 1 |
| Total fertiliser materials | 105,141 |
| Mixed fertiliser | 64,423 |
| Total | 169,564 |

## The Swiss Chemical Industry

A RECENT report of the Swiss Bank Corporation gives a very useful account of the importance of the chemical industry in Switzerland's economic structure. The industry is to be found preponderatingly in Basle, where it provides a large proportion of the population with a living.

Although the raw materials necessary for the industry are practically non-existent in Switzerland itself (tar being the basic product), Switzerland occupied even before the war second place as an exporter of colours and dyes. Germany led with 74 per cent. of the world's consumption, Switzerland came next with 7½ per cent., followed by Great Britain with 6½ per cent., France with 5 per cent., the United States with 3 per cent., and Austria with 1·60 per cent. The war brought about considerable changes, but Switzerland was able to maintain her position, mainly owing to the degree of technical skill her industrialists had reached, and the excellent sales organisation she had built up. The chemical industry stands fourth in the list of Swiss exporting industries, being only preceded by the watchmaking, textile and machinery industries.

The beginnings of the coal tar industry belong to the fifties of last century, but Basle is now the only centre. The reason for this is Basle's favourable geographical position on a river which carries away the waste products without adversely influencing other localities, and in its being situated in the centre, so to speak, of the Swiss silk ribbon industry and the neighbouring cotton and woollen industries of Mulhausen (Alsace) and Lörrach (Germany). Another reason was that many French chemists, owing to the unfavourable patent laws in their own country, sought more scope for their activities in Switzerland. The supply of native chemists in Switzerland is adequately maintained by the Federal High School in Zurich, an institution of international fame.

At the present time Switzerland's chemical industry is faced with the fact that many other countries are trying to build up their own dye and colour industries, and the result has been that the Swiss manufacturers have founded companies and factories in other countries. In 1918 the three leading Swiss colour manufacturers, Society of Chemical Industry (20 million francs capital), J. R. Geigy, S.A. (10 millions) and the Sandoz Chemical Works (10 millions) came together and founded the Basle Interessengemeinschaft, which still exists. At the beginning of last year the Basle concern came to an agreement with the German I.G. Farbenindustrie and the French Kuhlmann group with a view to co-operation in the matter of sales, but the Swiss firms themselves remain absolutely independent as regards their own particular sales organisations. The agreement with the German and French interests simply guarantees to the Swiss firms the technical and commercial possibilities of development. It is not known whether, in view of increasing British and American competition, any attempt will be made to come to an agreement with these interests as well.

## A Post-War Recovery

### Progress of Austrian Chemical Industry

THERE was hardly an Austrian industry which was put in a more precarious position by the dismemberment of the Austro-Hungarian Monarchy than the chemical industry. With the exception of salt, lead, and zinc ores, small deposits of copper ores, chalk, barytes, and mineral earths, practically none of the raw materials essential to the chemical industry are available in the territory of the new Republic. The industry's sources of supply of mineral oils, tar from coke plants, quicksilver, and many other important raw materials which had been available in the monarchy, are now in the Succession States, and these materials must be imported.

The total capital of the industry does not exceed 40,000,000 schillings. Altogether, approximately 550 chemical concerns are engaged in various lines of chemical production, of which only about a dozen are comparatively large firms.

The manufacture of chemicals is one of the few Austrian industries which weathered comparatively well the post-war economic crisis. After complete reorganisation, it has attained a position of importance among the chemical industries of Europe. Most factories at present are working at full capacity. To a great extent, these developments are attributed to favourable business relations with chemical concerns of other countries, particularly the German I.G. Farbenindustrie.

The leading export items in 1928, according to value, were acetic acid, tartaric acid, calcined soda, magnesium oxide, blood albumen, glue, litharge, white lead, drugs and medicinal preparations, ultramarine, lacquers and varnishes, and matches. These accounted for over half of the total.

Total imports increased 15 per cent., from 66,557,000 schillings in 1926 to 76,595,000 schillings in 1927. The upward trend continued, but the increase in 1928 was only 9 per cent. to 83,759,000 schillings.

Among the various import groups, industrial chemicals, accounting for more than half, were first in importance, followed by paints and varnishes with 20 per cent.

#### The I.G. Selling Organisation

Existing agreements between the Skodawerke-Wetzler A.-G., the leading Austrian chemical concern, and the German I.G. Farbenindustrie, have been steadily extended in recent years, with the result that the two companies have now a sales cartel which provides for a strict delimitation of sales territory and includes a price convention. The I.G. Farbenindustrie, which has a well-developed sales organisation covering most parts of Europe, has practically taken over the sole sale of Austrian chemicals with the exception of mineral acids and artificial fertilisers. On the Austrian market, however, the I.G. sells chiefly manufactures of the Austrian chemical factories, so far as they are produced in the country. German, French, and Swiss competition in Austria is eliminated by the agreement. Similar agreements apply to the Yugoslavian, Hungarian, and Balkan markets. Increasing competition from the Belgian chemical industry, an outsider to the cartel, has been evident in Central European markets recently.

In view of the small Austrian market and the strong international position of Germany and other major producers of organic dyes and medicines, there is practically no possibility for the production of such materials in Austria. Commodities of this character are in large part imported from Germany.

## Extensive Needs of Poland

THE average consumption of fertilisers in Poland at present, according to an official United States source, is very low, amounting to approximately 2 kilos of nitrogen, 2·5 kilos of phosphoric acid ($P_2O_5$), and 2 kilos of potassium oxide per hectare. Poland's territory extends over an area of more than 38,000,000 hectares, but only 18,000,000 are arable land and there is little prospect of increasing to any extent the area suitable for agriculture. The annual increase in population of approximately 400,000 inhabitants, or 1·5 per cent., adds 135,000 tons to the yearly grain requirement. The only solution of the problem of how to feed an increasing population from a stable area of arable land, therefore, apparently will be found in larger agricultural yields, which, in turn, necessitates a wider and more intensive use of fertilisers. The present yield per Polish unit is comparatively small in comparison with that of other European countries.

Polish soil shows considerable exhaustion, and its natural resources, with slight exceptions, do not suffice to assure even an average crop. The yield of the western provinces exceeds that of Poland's western neighbours, while the southern and eastern sections of the country show considerably smaller returns. The Poznan district, for example, has arrived at satisfactory results only by intensively fertilising the soil, as indicated in the following figures for the average crop per hectare in that district: 1881–1890 (without fertiliser), wheat, 9·4 bushels; rye, 7·5; barley, 7·7; oats, 8·2; and 1910–1914 (with fertiliser), wheat, 20·6; rye, 17·1; barley, 18·9; and oats, 20·2.

A continuous increase in Polish fertiliser consumption has afforded an extensive field for the expansion of the local industry, which has made rapid progress, particularly in the manufacture of nitrogenous fertiliser and superphosphates. Notwithstanding its development, it cannot meet the ever-increasing requirements of the domestic market, except for superphosphates. In order to cover the deficit, it has been necessary during the last several years to import considerable quantities of fertiliser from abroad, including basic phosphate slag, potassium salts, and, to a smaller extent, nitrogenous fertiliser.

## Imperial Chemical Industries, Ltd.

### Increased Profits for the Year

ACCORDING to the preliminary statement issued yesterday, the net profit of Imperial Chemical Industries for 1929, after making provision for obsolescence and income tax, amounted to £5,780,208, which compares with £5,212,703 for 1928. There was thus an increase last year of £567,505. The directors are placing £529,020 to general reserves, and are raising the "carry-forward" by about £242,000 to £350,923, after distributing a balance dividend of 5 per cent., making 8 per cent. for the year on the ordinary shares, and paying 2 per cent. on the deferred shares. The dividend on the ordinary is the same as for 1928, but the deferred shareholders get ¼ per cent. more. Last year £1,000,000 was placed to reserve, but only £27,000 was added to the "carry-forward."

The issued capital of this great undertaking (now £76,482,000) was increased last year by the sale in May of £4,410,000 of 7 per cent. cumulative preference shares and £6,017,000 of ordinary shares, the former being placed at a premium of 3s. per share, and the latter at a premium of 13s. 6d. The total reserves of the company now amount to £16,725,000, as compared with £11,009,138 a year earlier. The increase of £5,715,862 is due to the share premiums referred to (less expenses of issue) and to transfers out of profits of £529,020 to general reserve, and £575,479 to the central obsolescence fund. To the latter fund a sum of £415,383 has been added from the books of Synthetic Ammonia and Nitrates, Ltd. Reference is made in the statement to the company's investments, which on December 31, 1929, after deducting profits realized from the sale of investments, showed a depreciation on book value of £983,347. The directors express the opinion that in the case of the company's investments market prices did not represent their true value, and they state that the subsequent increase in market values has largely eliminated the book depreciation.

## Annual Meeting of Salt Union, Ltd.

### Working Agreement with I.C.I.

PRESIDING at the 41st annual meeting of the Salt Union, Ltd., at Liverpool, on Tuesday, the chairman, Mr. G. H. Cox, said that the profits, although showing a small falling off as compared with the previous year, were satisfactory, especially having regard to the many difficulties that had to be overcome and to the unfavourable economic conditions generally prevailing throughout the world. During the year many important transactions had been made in connection with their works and estates. The purchase of works at Winsford lately owned by John Garner and Co. had been completed and new office accommodation had been built at their Stoke Works, in Worcestershire. The acquisition of the Carrickfergus Saltworks Co., Ltd., had given them complete control of the Irish salt production, both rock and white salt, which he anticipated would be of considerable value to them.

A satisfactory working agreement with Imperial Chemical Industries, Ltd., *re* salt and chemicals, had been sealed, and an agreement with that company had been reached for the exchange of certain works in Middlesbrough, whereby I.C.I retired from the manufacture of salt for sale in that area, and the Salt Union absorbed their quota. They believed they would reap valuable benefits from these arrangements and from the friendship thus cemented with Imperial Chemical Industries Ltd. With the purchase of certain properties from Lord Delamere, practically the whole of the River Weaver banks on either side of the river from the Winsford Town Bridge up to Newbridge were included in the company's freehold.

With regard to the Eastern export trade, the chairman said that they had shipped less to Japan, but rather more to Calcutta, than in 1928. He was sorry to say that the competition in solar salt, to which he referred in March last, had brought about a dissolution of the Salt Importers' Association of Bengal.

In connection with home trade, he said that after protracted negotiations arrangements were made to carry on the Salt Manufacturers' Association for another year as a minimum period. So far there had been no fresh entrants to the quota scheme. He trusted that manufacturers still outside would soon recognise the advantage of joining with the principal manufacturers, if profits were to be earned. Given complete unity, the problem of dealing with the large importations of foreign salt would be far easier. It was well to remember that the menace from this quarter, even to our home trade, was a constant source of anxiety.

The report and accounts for the year were adopted and the meeting authorised the payment of the preference dividend at the rate of 2s. 4d. per share and the ordinary dividend at the rate of 2s. 6d. per share. Mr. H. J. Falk was re-elected a director.

## Compensation Claimed Back

### Action by Lever Brothers

BEFORE Mr. Justice Wright and a City of London Special Jury, an important commercial action was begun in the High Court of Justice on Monday and continued on Wednesday, in which Lever Brothers, Ltd., of Port Sunlight, Cheshire, claim against Mr. Ernest Hyslop Bell, of Granby Hotel, Harrogate, Yorkshire, and Mr. Walter Edward Snelling, of St. Ronans, Putney Heath, London, formerly chairman and vice-chairman respectively of the Niger Company, Ltd., damages for alleged conspiracy, faudulent concealment, breach of duty, and breach of contract. They further claim the return of £30,000 and £20,000 paid respectively to Mr. Bell and Mr. Snelling as compensation on the determination of their offices in the Niger Company—when it was last year amalgamated with the African and Eastern Trade Corporation—on the ground that the money was paid under mistake of fact; and rescission of the agreements under which those sums were paid.

It is alleged that Mr. Bell and Mr. Snelling, who as chairman and vice-chairman of the Niger Company, Ltd., received £8,000 and £6,000 a year respectively, had abused their trust by entering on their own account into secret buying and selling transactions with regard to cocoa, which was one of the commodities with which the Niger Company, Ltd., dealt. The plaintiffs say that if the defendants' conduct had been discovered before they were awarded compensation for the loss of their offices on the amalgamation they would have been instantly dismissed and no compensation would have been paid.

Generally, the defence is a denial of everything; though there is an admission, not of purchases or sales of cocoa by the defendants, but of speculative dealings in differences in cocoa.

## Dyers' Agreement

### End of Six Months' Negotiations

IT was announced on Tuesday that an agreement had been reached in the negotiations which have been taking place since last September over the proposals of the Bradford Dyers' Association with respect to the staffing of jigs, the restrictions and limitations of vessels, and re-dyes, and the aims of the Amalgamated Society of Dyers in regard to the transference of labour from one branch to another.

Mr. Edwin Verity, President of the Amalgamated Society of Dyers, in giving details of the settlement, said they had agreed to the grouping of men and machines, and, with certain modifications, to the principle of one man to two jigs (in place of one man to one jig as at present). The question of re-dyes (or menders) is deferred for the present with a view to securing the co-operation of the workpeople in an effort to reduce the necessity for re-dyeing.

They had also discussed the question of the transference of labour from one branch to another where men are working more than 48 hours a week, and had agreed that when the Association decided to transfer a number of their operatives half of them shall be taken from the books of the A.S.D.; in other words, to act on a "50—50" basis.

Owing to the continued shrinking of orders and the small number of pieces required to be dyed to a shade, it had become absolutely essential that economies should be instituted by the Association. The delegates to the Wages Board realised this, and agreed to the grouping system—a given number of machines for a given number of men—in order to obtain the maximum efficiency of the plant.

# Chemical and Allied Industries of Lancashire

## By Rex Furness

*In this article some account is given of the chemical products of Lancashire and of their numerous uses in industry, especially in the premier industry of the county, the manufacture of cotton fabrics.*

So much has been written from time to time about the chemical industries of Lancashire that, when invited again to write on this subject, it appeared difficult at first to discuss the matter from a new angle. Still, whilst the service that Lancashire chemicals render to the cotton industry in particular and to a world of industry in general is reasonably well appreciated, it is perhaps not so well realised that the service departments of many Lancashire chemical producers are ever opening out new fields of utility for chemicals and stimulating the interest of new consumers in many directions, to the ultimate economic advantage of both the consumer and producer.

We were led to meditate along these lines as, standing before a white-hot inferno emitting from its open port a Sahara-like gust into an icy world, we saw a red-hot molten mass congeal into great greenish boulders, looking for all the world like the broken fragments of some Gargantuan aerated water bottle. We recollected that the silicate of soda " glass " and the several varieties of silicate of soda solution made from it were being manufactured efficiently and cheaply—in accordance with the best traditions of the scientific control of which the Lancashire chemical industry is justly proud—but that the story did not end there. Silicate of soda has a score of applications which must be fully studied and made widely known to hundreds of potential consumers by means of an effective service organisation.

### A Typical Lancashire Chemical and Its Uses

Silicate of soda is one of the elder children of the family of Lancashire chemical products and it is utilised in many ways in amounts that are huge in comparison with its application as a soap " builder " and detergent material—its first technical application.

It may be well to pause a little here to show how this type of service organisation, not uncommon within the Lancashire chemical industries, has enormously increased the demand for silicate of soda by an intensive study of its general properties and by adapting them to widespread economic uses.

Silicate is a valuable adhesive which is superior to many organic adhesives in several ways (which cannot be discussed here) and, in its various types of solution, it is being used for making paper board, corrugated board, many other forms of built-up board, book bindings, etc. It is employed for sticking together many kinds of materials such as leather, imitation leather, felt, cork, wood veneers, etc.; for sealing containers, affixing labels and for similar purposes, each of which has had to receive individual attention in order that the particular user of silicate may reap the full benefit of its application and the manufacturer profit by the inevitable increased demand.

It has been found possible to apply silicate to the surfacing of concrete roads and to the actual construction of macadam roads, which show far better wearing qualities than the old-time water-bound macadam road. It is used in making types of high temperature cements and acid-resisting cements and in the making of fire-proof paints. It is a valuable adjunct to resin in paper sizing, and barrels may be given a cheap and effective lining with its aid.

The very first use of silicate of soda, namely, as a soap builder and detergent, is still practised, and it is to be remembered that it is by no means an adulterant, but a real adjunct to soap, whilst it has many other uses such as egg preserving, paint making, mineral flotation agent production, and others too numerous to mention.

In new applications of a chemical product it is vital that full and accurate information be supplied to possible consumers and the demand for Lancashire heavy chemicals will continue to increase as service organisations are enlarged.

### Water Softening

In Lancashire is being made the most highly active base exchanging compound known, whether natural or synthetic, and as the value and even the necessity for softening water for industrial and domestic purposes is becoming more realised, its production is steadily increasing. This material, the production of which by the way involves the use of silicate of soda, has been exhaustively examined from almost every angle—its capacity to exchange soda for lime at different speeds of water flow, its minimum requirement of sodium chloride in the " regeneration " stage of the water softening cycle, its resistance to water flow, and therefore the pressure head necessary to pass water at various speeds, its permanence, the best method of water distribution over the mass of softening agent, the optimum size of granule and so forth. The water softening engineer, therefore, is placed in possession of a host of facts relevant to the most profitable use of the water softening material. He appreciates these to the full, applies them with or without slight modifications, and the producer is assured of a highly satisfied user whose requirements increase regularly.

In a similar way, the uses of the new solid absorbent, Silica Gel, are being studied as indicated in this journal a fortnight ago. A Lancashire factory is co-operating with a well-known firm of chemical plant manufacturers, and who can tell what will be the future of solid absorbents when their value has been pressed home upon coal gas makers, sulphuric acid and artificial silk manufacturers, air conditioning plant makers and all who find it essential for reasons of economy or hygiene to recover or remove solvent vapours from air or gas ?

Another Lancashire factory has developed the production of a highly active absorbent carbon, and its service oganisation has already shown it to be capable of effective use in many directions.

### A Re-created Dyestuffs Industry

The story of the re-creation of the coal tar dyestuffs industry in this country and particularly in Lancashire has been told often. To-day we are making well over eighty per cent. of our own requirements of synthetic dyestuffs and exporting quite a large amount, instead of, as in pre-war days, importing eighty per cent. New products are constantly appearing as the demands for special dyes for artificial silk increase, as really fast dyes are called for, as levelling colours come to be wanted or as some special feature thrusts itself upon the attention of the cloth dyer or printer. Competition is keen, however, and the Lancashire maker has realised that he must be able to show the potential user exactly how to apply the new dyes. The work of service organisation is necessary and is bearing fruit.

As the dye makers produce also a variety of materials for rubber vulcanisation, lake making, colours for dyeing materials other than textiles, antiseptics, disinfectants, insecticides, fungicides, seed treating chemicals, photographic chemicals, inhibitors of acid attack for use in iron sheet pickling operations and many other commodities, it is vital to effective and widespread sale that individual

attention be given to users' problems. To be given exact instructions how to use a new product or to be given sufficient data upon which to commence a likely line of investigation is the function of service departments, and the progress of Lancashire chemical industries is due in no small degree to the realisation of this fact in the county and abroad amongst a host of consumer customers.

### Heavy Chemicals

Lancashire may well be regarded as the birthplace of the heavy chemical industry, and her factories to-day supply the basic chemicals for many purposes. The standard heavy chemicals such as soda, sulphuric acid, salt cake, and so forth, are made in the most efficient manner—which is tantamount to saying at the cheapest possible rates—so that in times of normal trade and industry they may almost be said to sell themselves, and service organisations in the fullest sense are not required. Thus it is not necessary to tell the electrical battery makers of the county how to use sulphuric acid, the soap makers how to use caustic soda, or the glass makers how to use salt cake.

The heavy chemical industry of the county supplies acids for fertiliser making, glass making chemicals, leather manufacturing requisites, acids, alkalis and salts for metal working, wire drawing, sugar manufacture, glue and gelatine manufacture, pharmaceutical and medicinal chemical manufacture, whilst many acids, etc., are supplied for use in the making of dyestuffs and intermediates, rubber vulcanisation accelerators, fine chemicals and so forth. Acids and alkalis are required for the treatment of coal tar, the refining of vegetable and animal oils and fats and for countless other industrial activities. At bottom, however, we may think of the heavy chemical industry as having been called into being to supply the alkalis, soaps, bleaching agents and the like required by the cotton industry of the county.

### Chemicals for Cotton

It was not long after the epoch-making inventions of Arkwright, Hargreaves and Crompton that cotton began to be manufactured in real earnest and following the erection of the first mill in 1781 and its rapidly growing family, it soon became apparent that many chemicals must be made near at hand for processing the cotton yarns and goods. Lancashire is blessed with an abundant supply of raw materials required for the production of heavy chemicals, and as the demands of the cotton industry increased heavy chemicals came to be made in increasing quantities and delivered to the cotton cloth treater *via* a network of roads, canals, railways, which the Lancastrian saw to be essential. It was realised very early in Lancashire that transport and handling play a very important economic part in the supply of bulky materials, a lesson which is only too recently being applied within the more limited confines of chemical factories themselves.

With the production of one heavy chemical for the cotton industry came the possibility and economic desirability of making another, and the progression went on until to-day all sorts of chemicals, not necessarily for the cotton industry alone, are made and heavy chemical production has developed into dyestuffs making and even fine chemical production.

### Chlorine and Alkali: Dyestuffs and Fine Chemicals

If we were ever tempted to write a sort of chemical "Forsyte Saga" we should head our fanciful genealogical table with Old Father Cotton, born about the same time as Old Farmer Jolyon. Amongst the children of the first generation would come chlorine and alkali and in the third and fourth dyestuffs, and fine chemicals amongst their descendants, living in almost every phase of modern industry.

The history of the family has revealed, as in the case of the Forsytes, that the individual members were often at strife with one another. We shall not re-tell in detail, for instance, how the Leblanc process—established by Muspratt of Liverpool in 1823 after the repeal of the salt tax—held unassailed sway by working up first one by-product and then another, until challenged by the cheaper ammonia soda process of Brunner and Mond and how this later found a new competitor in the electrolytic process whereby both caustic soda and chlorine were made by the electrolysis of brine. The old Leblanc process lived until 1923, whilst the other two main processes for alkali making which stand at the base of the heavy chemical industry still thrive in that interplay of economic competition which has done so much to advance the industry as a whole.

We must pass briefly, too, over the dyestuffs industry of the county. It need be said in a few words only that the science of synthetic dye making was lost to Germany in the later decades of the nineteenth century only to be re-created in this country—and not the least in Lancashire—in war and post-war years. The industry has shown creditable enterprise in the manufacture of well known and tried out dyestuffs but also in the creation of new products with special properties. It is impossible even to refer to these by name, and our previous articles must be left to supply details. The application of dyestuffs to the fibre receives constant study, and the service organisations of our dyemakers have played no small part in the advance of the industry as a whole.

Many industries thrive in Lancashire which use home county chemicals and the progress of the latter industry has meant a cheaper supply of necessary chemicals. Thus within the county there exist factories for the making of leather, glass, matches, rubber goods, soaps, edible fats, glycerine, sugar, ultramarine, ceramics, coal tar distillates, etc.

### Relation to Allied Industries

Many of these industries allied to the chemical industry were in existence long before the birth of the heavy chemical industry, but their later development has only been possible as the chemical industry proper has advanced. Thus, already in 1709 soap was being made in a small works near Southport and before the end of the eighteenth century there were other factories producing soap. During the early nineteenth century many firms whose names are household words to-day came into existence. Similarly there are records of the existence of a glass house in Liverpool in 1715, but it is since the repeal of the glass duty in 1845 and the availability of cheap chemicals that there has been a rapid increase in the number of factories and a great expansion in types of product. Lancashire glass makers are held in the highest regard to-day.

Sugar, too, was being made in Liverpool in 1667, and the industry is one of great importance to Lancashire to-day.

The list of chemical and allied industries carried on in Lancashire has by no means been exhausted for, as is to be expected, many chemicals which are used in cotton treating operations as well as in many other directions are produced. For instance, alum and aluminium salts, chromates, dichromates, tannic acid, sulphonated oils, Turkey red oil are amongst such products. These are used by the cotton manufacturer, but in addition by the water purifier, the tanner, the artificial and natural textile worker and by others who benefit from the cheap chemicals available from Lancashire factories.

### The Cotton Industry

The major industry of the county, cotton manufacture, is suffering from a period of great depression, and many reasons have been advanced to explain this unfortunate state of affairs. Without in any way wishing to appear unsympathetic or unmindful of the great efforts which the industry is making to regain for itself and for the nation its erstwhile prosperity, it may fairly be claimed that the position is in no way due to the non-availability of essential

chemicals or to their unreasonable prices. The heavy chemical industry of the county depends so much for its prosperity upon the demands of the cotton manufacturer that every help is extended to him by making chemicals available at the lowest possible prices. The Lancastrian is credited with dismissing sentiment in his business dealings, and the attitude of the home chemical industry may therefore be offered on the basis of sheer common sense and self interest. The chemical industry cannot rely alone upon its export trade and is therefore looking forward with sympathetic anxiety to the return of prosperity within the Lancastrian cotton industry.

# Chemical Plant and Machinery

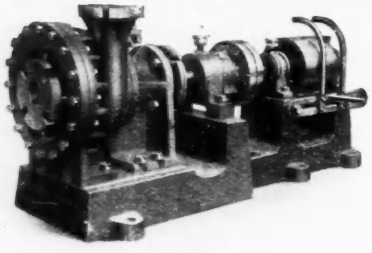
## Notes on Lancashire Firms and Their Products

*Lancashire is a notable centre for the manufacture of chemical plant, chemicals and materials of chemical interest, and the following notes give some indication of the wide variety of products of this nature to be obtained from firms within the county.*

### Acid-Resisting Plant

#### Meldrum Metal

Among works of great interest to chemical engineers in the Manchester district are those of Meldrums, Ltd., Timperley, one of the largest manufacturers of acid-resisting metal goods in the country. Their product, known as Meldrum Metal, has achieved a very wide reputation, and it is resistant to sulphuric, nitric, acetic and hydrochloric acids. Owing to its extreme hardness, it is particularly suitable for parts subject to wear, such as centrifugal pumps, cocks and valves, acid elevators, etc. Centrifugal pumps form a large item in Meldrum's manufactures to-day, and most of the artificial silk



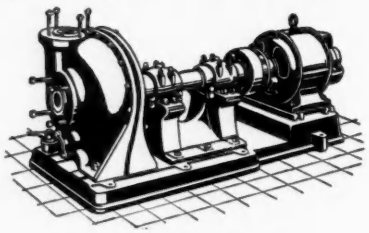
An Improved Design of Meldrum Acid-Resisting Pump arranged for Belt Drive.

companies are users of their acid pumps. These are supplied in a range from 500 to 30,000 gallons per hour, with lifts if necessary, up to 100 ft. Their manufactures in cocks and valves are very extensive, and include plug cocks, gland cocks and sluice valves. In the textile trade Meldrum Metal is in increasing use for dye vats, jiggers, rollers and bearings. Meldrums' centrifugal gas scrubbers are mainly used on the coke oven installations for the extraction of benzol and ammonia.

The timber and woodworking trade absorb a large percentage of the output from the firm's destructor department. Where there is a considerable amount of wood refuse, a steam boiler or water heater is employed to absorb the heat of combustion. The steam is used for timber drying or for heating the shops. The increasing outcry against black smoke has encouraged many firms to adopt systems which are chemically correct in the firing of their boilers. The Meldrum mechanical stoker affords a means of supplying just the correct quantities of primary and secondary air to suit the load, and thus ensures a complete absence of black smoke and the utilization of the cheapest grades of fuel. At the same time, owing to the greatly improved conditions, further increased outputs can be obtained from boilers, and very frequently the installation of additional boilers can be saved by obtaining more steam from existing ones. In many industries, such as paper making, where a complete absence of grit is necessary to obtain the most perfect products, the Meldrum Koker Stoker is largely employed.

#### Stoneware Pumps

An interesting solution of the problem of handling acids, alkalies and other corrosive liquors is found in the "Acidum" armoured stoneware centrifugal pump, for which Mr. L. A. Mitchell, of Harvester House, 37, Peter Street, Manchester, has the sole British agency. The pump casing is of close-grained cast-iron, whilst the pump body and all internal parts in contact with the liquor to be handled are of high grade stoneware, which is equally impervious to acids, alkalies or other corrosive liquors. Owing to the acid-resisting properties, these pumps are suitable for handling fruit juices, essences and other liquid food products, where it is essential that the

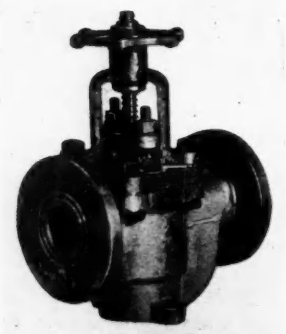


The Mitchell Pump.

liquor to be pumped shall not be in any way contaminated by contact with the pump. The "Acidum" pump is made in a wide range of sizes, having suction inlets from $\frac{3}{8}$ in. to 5 in. bore, and can be arranged for belt drive with fast and loose pulleys, or for direct coupling to an electric motor. The pumps are designed for continuous service, care being given to the balancing and testing of the impellors. As a result, the maintenance charges are low, even after they have been in service for long periods.

#### Acid-Resisting Valves

Appleton and Howard, Ltd., of 12, Salisbury Street, St. Helens, Lancs., established in 1870 as chemical engineers and brassfounders, have supplied many chemical and artificial silk manufacturers, both at home and abroad, with their improved non-rotating Regulus metal stop valves. These valves are used for acids, thick and muddy liquids, and other corrosive fluids. They are also made in special cast iron, and are



An Appleton and Howard Valve.

renowned for their long life. Old seats and plugs can be taken out of the valves and new ones replaced in a few minutes, and no pipe joint need be broken for renewals. When opening and closing the valve, the plug cannot revolve, because of the snug operating in a slot, and therefore insuring a direct and instantaneous motion. Spare sets of plugs can be re-cast and finished on screws at a very small cost, and generally a great reduction in tap bills is claimed to follow from the use of these valves.

Appleton's improved non-rotating acid egg valves, with

renewable seatings and plugs are another speciality, made in special cast iron for sulphuric and nitric acid, or in regulus metal for any other fluid. They have been designed to combine neatness with strength. The body, cover and spindle and all parts that come in contact with the liquid are made of special acid-resisting metal, and the top gear, including bolts and nuts, of special gunmetal.

In the foundry, high class castings are made from bronzes and gunmetal, and the firm also specialises in castings from silicon aluminium alloy and nickel alloy, or any castings to customers' specifications and tests. Another department is given up to the manufacture of Appleton and Howard's improved centrifugal pumps, for acids and other corrosive fluids, made in sizes from 1 in. upwards.

## Chemical Containers

### Indestructible Drums

It is an undoubted fact that much trade, particularly export trade, has been lost through the bad condition of packages on arrival. E. A. Brough and Co., of Liverpool, to make sure that the packages they offer withstand all mishaps or misuse likely to be encountered on an average journey and still have a margin of safety, offer a drum of moderate weight which can be filled and dropped 30 ft. without bursting.

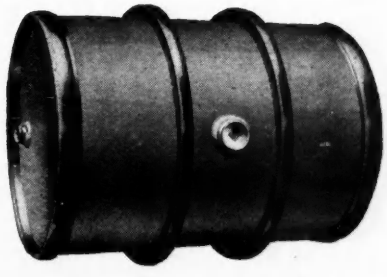
The illustration herewith shows a standard drum which has been filled and dropped 30 ft. three times without bursting. The majority of their drums are patented and welded throughout with steel neck or screw bung, and the top and bottom of the drum is formed like a sunken cap, the edge being brought

THE BROUGH DRUM AFTER ITS TEST.

over the body of the drum and neatly welded. The corner of the top and bottom therefore forms an angle of 45° with the body of the drum, and this angle makes it impossible for the edge to be bent under when the drum is dropped on its corner. The firm contends that as all carriers drop the drum on its corner when taking it off a cart, this protection against the edge buckling does away with 95 per cent. of possible bursting or leaks, and so sure are they of their ground that they offer an unconditional guarantee against bursting or leaking with their patent packages. The necks of the drums are either fitted on the sunken top or on a raised sump which allows them to fit the neck (which is of strong steel) on the extreme corner of the top of the drum, thus allowing every drop of the contents to be easily poured out. They also claim that their type of top can be easily kept perfectly clean, and their customers do not run the risk of dirt or other matter falling off the top of the drum and mixing with the contents as they are being drained. The drums, kegs and tapers are made in all sizes, from 1 to 80 gallons, and are competitive in price. To meet the requirements of customers using the old type of double-seamed or double-hooped packages, the firm offer a full range of all sizes in black steel, tinned iron or galvanised iron, and claim that the lessons they have learned on the testing of their patent welded packages enable them to eliminate (as far as the type will allow) a lot of the faults and weaknesses found in the old type of package. In their welded hooped drum the body, bottom and hoop of the drum are all welded into one piece, so that the joint is stated to be almost impossible to burst.

### Braby Steel Containers

Established in 1839, Fredk. Braby and Co., Ltd., Havelock Works, Litherland, near Liverpool, are one of the oldest manufacturers of steel containers in the country, and to-day the number of their firm's employees exceeds 2,500. In consequence of the increasing call for their steel drums, the existing shops at Litherland, Liverpool, have proved inadequate, and it has, therefore, been necessary to increase their mannfacturing facilities considerably. On February 17 last, production was commenced at a new works, recently erected at Aintree, near



Liverpool. This factory is completely equipped with the most up-to-date automatic machinery. There is a private siding, and the railway track is so arranged that it passes through the workshops and despatch departments. The firm specialises in the manufacture of steel drums of all types for the chemical and oil trades, in sizes ranging from 20 to 120 gallons capacity, and in all strengths from 20 w.g to $\frac{3}{16}$ in. pl.

Our illustration represents one of their standard "A" type drums, suitable for the chemical trade—all joints are welded and the body is strengthened with suitable H section rolling hoops and end copes. Other types of drums, particularly single trippers, are produced in large quantities.

### Carboy Hampers

P. L. and G. S. Harris, Ltd., of Lostock Gralam, are makers of the Vulcan iron carboy hampers, the pattern which has been used by the chief chemical manufacturers for nearly half a century. They also make all accessories for the safe carriage of chemicals, such as safety crates and hoods to comply with the Railway Clearing House regulation governing single carboy or small lots forwarded by rail. Large supplies of glass carboys, ready packed in "Vulcan" hampers, are maintained, and the company's well-placed railway siding enable them to give immediate delivery at all times.

## Cotton and Viscose Finishing

### Some New I.G. Auxiliaries

SOAP, that much used auxiliary in textile finishing, being easily affected by lime and acids, cannot, for that reason, be employed in quite a number of special finishing processes and the following are other auxiliaries for the dyeing and finishing trades which are being marketed by I.G. Dyestuffs, Ltd., of Cromford House, Cromford Court, Manchester :—

*Turkey Red Oils*, obtained by the sulphonation of castor and other oils, are preparations which, in regard to resistance to acid and hard water, are much superior to soap. The *Monopol* preparations, of which Monopol Soap is the best known, are obtained by an improved process of sulphonating castor oil. Owing to their good fastness to acids, salts and lime, they are extremely useful in dyeing, finishing, scrooping, and emulsifying. Monopol Brightening Oil and Monopol Brilliant Oil SO 100 per cent. are products suitable for the after-treatment of dyeings, for softening, etc.

The *Prestabit Oils*, again, are produced by the further perfection of oil sulphonating processes. Prestabit Oils are remarkable for their unique fastness to acids, caustic alkalis, lime, Epsom salt, and, in addition, good wetting out and penetration properties. The "G" and "V" brands of Prestabit Oil, as a matter of fact, are practically indispensable for many purposes of cotton and viscose finishing. For instance, they are eminently suitable for the production of Epsom salt finishes, particularly the cheaper "G" quality which, in conjunction with Epsom salt, does not precipitate and gives a full soft handle. The "V" brand, applied by the padding process, ensures the penetration of even the heaviest and tightly woven goods with vat dyestuffs of all kinds. The "KN" brand is an effective cheap softening and wetting-out agent, whilst the special brand "BM" is used in mercerisation. The susceptibility of soap to lime makes the use of hard water for washing with soap, if not impossible, at least very uneconomic, as the lime soap which separates out in a sticky form when washing or rinsing with hard water dulls the fibre

and has a detrimental effect upon the feel, lustre, and smell of the goods. The addition of a small quantity of *Intrasol* during the soaping prevents these injuries to the fabric by adhering lime soaps.

### Auxiliaries from Coal Tar Derivatives

Novel auxiliaries for textile finishing have recently been produced from coal tar derivatives. They are free from salt, soap, and fats, and the leading position among them is occupied by *Nekal BX Dry*. This is an almost white powder of easy solubility, which excels in wetting out properties.

Emulsions required in the processing of vegetable fibres for finishing, scrooping, etc., may be obtained with *Nekal AEM* in a simple way and in an exceedingly stable form. The emulsions prepared with *Nekal AEM*, in addition to being very stable, are distinguished by an unusually fine dispersion of the emulsifying fats, oils, waxes, etc., and also show a neutral reaction.

The preparation of paraffin wax emulsions requires suitable machinery and considerable experience, and such emulsions of suitable composition are on the market under the names of *Ramasit I* and *Ramasit WD Conc.* *Ramasit I* is used in the finishing of cotton, linen, and viscose, where it is necessary to give the material a full supple handle, and on piece goods it gives increased body and lustre. If Ramasit I is used on goods which are to be raised, the pile is opener and softer. Yarns are given a scroop which is not lost in storing, and the winding properties of viscose yarn are improved.

*Ramasit WD Conc.* is a special preparation for water proofing, improving at the same time the feel of the goods. It is applied in one bath in conjunction with alumina salts. Used by the two-bath method along with soap and after-treated with alumina acetate, it gives exceptionally good results.

*Laventin KB* meets very efficiently the textile industries' demands for a good fat solvent. The product is highly concentrated and soluble in water. It is best applied in conjunction with soap and is used for removing greasy impurities of any kind caused by vegetable or mineral oils, and may also be used successfully for desizing viscose, even if linseed oil has been used. In place of linseed oil sizes for viscose, the use of which is attended with many drawbacks, *Ortoxine K* may in many cases be used. This is a size for viscose which is readily miscible with water. Its special advantage is that it can be removed with comparative ease.

Of new finishing agents *Cellapret* should be mentioned as unlike the usual starch preparations. It does not conduce to the formation of mildew stains on the cloth.

*Katanol.*—Some years ago Katanol O and W, which substitute tannin acid and tartar-emetic for the mordanting of textiles in dyeing and printing, were placed on the market. The " O " brand has found much favour in cotton dyeing and the " W " brand in viscose dyeing. As compared with the tanning process, the Katanol method is much simpler and cheaper to apply, the resulting dyeings being much faster to washing and alkalis. More recently, the new improved brand of *Katanol ON* has been brought out. It has the advantage over the " O " of being absolutely colourless, and consequently of producing clear shades. Katanol ON is applicable both in cotton and viscose dyeing and printing.

*Dullit.*—This product was put on the market for delustring viscose (woven and knitted fabrics and particularly stockings), for which purpose it has proved very useful in many cases. The delustring is carried out by special methods, and the viscose is given a desirable mat appearance resembling natural silk.

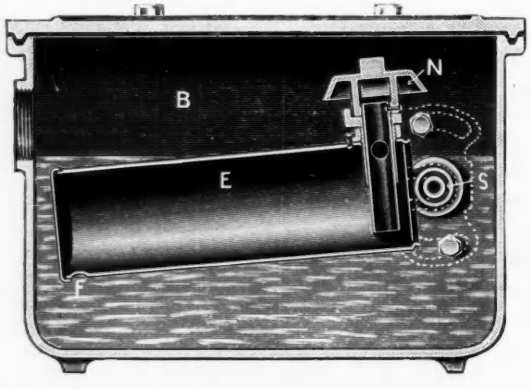
## Asphalt Specialities

John Dickinson and Co. (Bolton), Ltd., Fairclough Street, Bolton, have for many years past catered definitely for the requirements of the asphalt industry generally, with special reference, perhaps, to the building, textile, paper making, dyeing, calico printing and finishing trades. Whilst, of course, manufacturing the established commercial types of asphalt used in building and engineering construction, Messrs. Dickinson have evolved proprietary brands adapted to meet a number of specific conditions such as their " Seal," " Tropicas," " Aciteneo," and other registered brands of mastic asphalt. The " Seal " branded asphalt is manufactured from 100 per cent. natural rock, ground to appropriate fine grading and fluxed with high-flash point oil, and refined Trinidad bitumen, placing it amongst the highest class of mastic asphalts, employed as a first grade water-tightening agent for overlaying flat roofs of concrete or wood construction, and the lining of stone, brick, concrete or wood tanks to render them water and alkali-tight. Their " Tropicas " registered brand of mastic asphalt was introduced to enable works, floors and roadways successfully to withstand the heaviest foot, trolley and vehicular traffic and standing weights under abnormal temperature conditions without indentation or grooving effect. " Aciteneo " registered brand of asphalt is put forward as satisfactorily meeting the conditions in bleach, dye and fabric printing works in general, and the rayon manufacture in particular. It is used for the surfacing of works departmental floors, trays, benches, etc., and the lining of tanks and channels of practically all constructions, rendering them capable of storage of acid or alkaline fluids, and also capable of withstanding any foot and trolley traffic. Particulars of other asphalts for special purposes will be given on application. Constant research and tests are carried out in this company's excellently equipped analytical laboratory by trained chemists, and the firm also places the consultative service of their technical and/or practical representatives at the disposal of potential clients without charge or obligation.

## Lancaster Steam Trap

The " Lancaster " steam trap usually repays its cost in a very short time. For its purpose of draining away the water condensed in steam pipes and heating apparatus, while " trapping " or preventing the escape of steam there is a loose disc valve at the orifice of the discharge pipe in connection with a quick threaded screw motion, worked by a float. This valve is frictionless in action, and, being loose, cannot stick to its seat. It is very rapid in its movements for opening and closing the discharge pipe, and the working parts are simple and easily examined. It also acts as a safety valve, as any excessive pressure exerted against the face of the loose disc valve would, by virtue of the quickness of the screw thread, force it open. It is an " elastic " trap as it will drain the water away at any temperature from 212° up to a few degrees of the saturation temperature of the steam by adjusting the air valve " N " (see illustration) on the top of the float. The cover can be removed while the trap is at work to observe its action and see the water discharged.

The " Lancaster " Bucket Type Traps will only discharge the water at saturation steam temperature, and have a greater capacity than the float type trap described above. They will

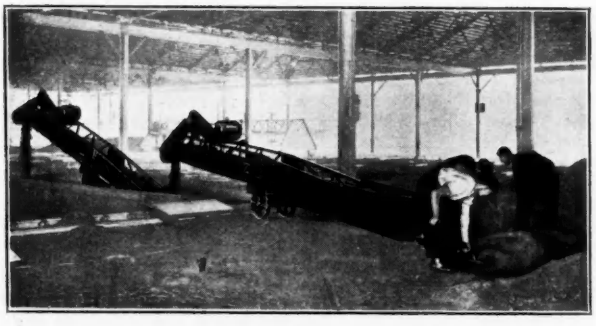



also lift the discharged water to any required height. When their drainage capacity and space occupied is taken into account, their prices will compare favourably with anything on the market. The " Lancaster " traps have been made for capacities up to 50,000 lb. per hour and for pressures up to 400 lb. per sq in.

In addition to the above Lancaster and Tonge, Ltd., are makers of the " Lancaster " patent piston rings, metallic packings, steam dryers, machine moulded wheels, and undertake general hydraulic and engineering work.

## Portable Conveyors

Some works still contine to man-handle coal, sand, stone, chemicals and bagged materials, when mechanical loaders are available which can carry out the work at from one-third to one-half the cost of hand labour. The conveyors manufactured by Crone and Taylor, Ltd., Sutton Oak, St. Helens, are constructed to handle their rated tonnage per hour for at least



TWO C. AND T. CONVEYORS IN USE AT A GAS WORKS.

three or four years before any repairs whatsoever become necessary; they are fitted with ball and roller bearings throughout so that they need the minimum of attention, and lubrication is required only once in two months when the machines are in continuous use. The machines while sturdily constructed to withstand the rough use at the hands of unskilled labour, are light enough to be moved freely from one job to another. In one case two C. and T. machines have been at work in a certain gasworks, discharging and re-filling purifiers. It is stated that since installing them the oxide handling costs have been reduced by 40 per cent. These machines are each capable of handling 20 tons of oxide per hour and work in tandem, one machine delivering on to the other. In a chemical factory where loose and bagged materials were formerly loaded out into railway wagons by hand at a high cost, a C. and T. portable conveyor and portable stacker now do the work. The men work on a piece-work basis, and handle 25 tons per hour of bagged material and 30 tons per hour of loose material. The loading costs have been reduced in this case by 65 per cent. In cases where standard C. and T. conveyors do not fit in with intricate handling problems, Crone and Taylor, Ltd., are always willing to investigate the conditions and submit alternative designs, based in constructional details on standard machines but amended to meet particular requirements.

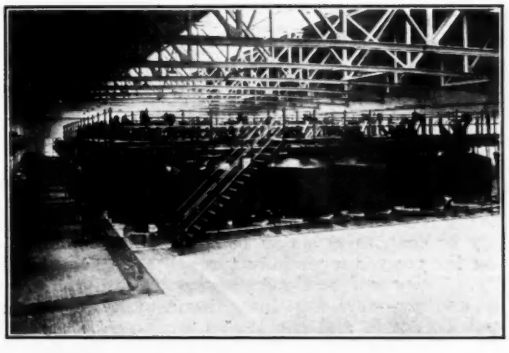
## Laboratory Apparatus

J. W. Towers and Co., Ltd., of Victoria House, Widnes, are primarily suppliers of every requisite for a chemical laboratory. They are agents and stockists for all the leading manufacturers of chemical glassware, filter paper, porcelain, etc., and also make many pieces of apparatus themselves. Distillation of hydrochloric, nitric and sulphuric acids has long been an important branch of their home and export business, and more recently, glassware for artificial silk manufacture has been produced in large quantities.

Scientific instruments of all types, chemicals and chemical apparatus are supplied by James Woolley, Sons and Co., Ltd., 76, Deansgate, Manchester. The business was established in 1796, and now includes works and laboratories in Knowsley Street, Manchester, offices and warehouse at Victoria Bridge, and extensive showrooms and workshops at the Deansgate premises. Their chemical apparatus catalogue is a well produced volume running to nearly 200 pages and fully illustrated. Smaller catalogues recently issued deal with Woolley ambulance room requirements and first aid boxes for works, laboratories, etc.

## Mechanical Water Filtration

During recent years the system of rapid mechanical filtration has been widely adopted by important waterworks authorities and large industrial concerns throughout the world. The success of mechanical filters is the direct result of extensive scientific research, in which Bell Bros. (Manchester, 1927), Ltd., Denton, near Manchester, have played a leading part, and their mechanical filtration plant is to be found in all parts of the world. The old system of slow sand filtration, while in some cases it offered certain advantages, was, on the whole, an inconvenient and unsatisfactory process. A very large area was needed to provide the necessary filtering surface. The beds had to be rested for lengthy periods, and after cleaning, a large volume of water had to be run through to waste before efficient filtration recommenced. In addition, tracks or canals formed so that the water passed through practically unfiltered, and the slowsand filter would not remove any colour from a water supply. The modern system of mechanical pressure filtration entirely eliminates these difficulties and offers many other advantages. The principles embodied in the " Bell " filter are particularly efficacious, and are the result of forty years' continuous experience and research in water purification problems. Briefly, the " Bell " filter comprises a mild steel shell, containing a patented system of strainers and collecting pipes. The whole bottom of the bed is covered with strainers, and water is thus collected uniformly from all parts of the bed. This arrangement of strainers also adds to the efficiency of washing the bed. Agitation of the filter bed is effected by means of a hollow hydraulic shaft running down the centre of the " shell," to which are attached hollow arms. These arms are provided with rakes, extending to within a minute distance of the inside of the shell and also with a row of small valves. When washing the filter, the bed is first put into suspension by a reverse flow of filtered water, and the arms are then revolved by hand or mechanically. At the same time a current of water is forced down the hollow shaft and arms and out through the back-pressure valves. Strong jets are thus formed which further agitate and thoroughly scour the sand. All particles of dirt are carried away by the reverse flow of water. By this system



THIS PLANT OF 48 " BELL " FILTERS, INSTALLED FOR THE DERWENT VALLEY WATER BOARD, HAS A CAPACITY OF SIX MILLION GALLONS PER DAY.

a " Bell " filter can be efficiently washed in from two to five minutes, and filtration is recommenced almost immediately. Bell Bros. have also introduced a new type of chlorinating apparatus for adding gaseous chlorine to water supplies. This apparatus is simple in design and offers exceptionally accurate control of the amount of chlorine added. In addition to the apparatus mentioned, the firm produces mechanical pressure filters specially adaptable for industrial purposes; filtration, aeration and heating apparatus for public swimming baths; intermittent, continuous and base exchange water softeners, and small filters for use in villages, private residences, and to meet all comparatively small requirements.

## Large Scale Water Supply

In the manufacture of silk, artificial silk, woollen and cotton goods, water in large quantities is used by industrial plants, and in many towns where the water is expensive, varying from 7d. to 2s. per 1,000 gallons, it has become imperative, in the face of present-day competition, to look for new sources of water supply. This is particularly so in the case of industrial areas where there are no rivers or other surface supplies. Some notable achievements in well-boring stand to the credit of the firm of John Thom, artesian well

engineers, Patricroft, Manchester, including the sinking at Bradford recently of a 720-foot well, which is now yielding 35,000 gallons of water per hour. In our illustration of a test pumping plant, steam driven, will be seen a piece of core which


was cut and drawn up from 700 feet below the surface. Employers, states Mr. Thom, are becoming keenly interested in this problem of water provision, and his firm is at present sinking boreholes in many parts of the country both for industrial concerns and municipalities.

### Chemical Sprays

Increased capacity of sulphuric acid plant results when using water sprays instead of steam, especially in hot weather, when steam naturally condenses very slowly. Highly efficient sprays for this purpose are the "Monarch" stoneware chamber sprays, for which H. T. Watson, 46, Fairfield Road, Widnes, is sole agent. They are of simple and durable construction, and the disc is loose fitting for cleaning purposes—the necessary gyratory or centrifugal action being produced by the water entering the recess tangentially through the grooves at high velocity. This nozzle works just as satisfactorily in one position as another—spraying down, horizontally or upward—and may be cut in and cut out as often as desired to suit changing conditions, without interfering in the least with proper atomisation at all times. If operating normally at 60 to 80 lb. at nozzle, the capacity may be decreased over the whole set by dropping the pressure to 30 or 40 lb. (depending on capacity tip being used) without the necessity of cutting out and in nozzles to regulate the strength of the acid, because "Monarch" atomising sprays give exceptionally fine atomisation at these comparatively low pressures. Nozzles are also made of cold acid spraying in acid chambers and towers.

### Coppersmiths' Work

South Lancashire, and Manchester in particular, is a noted centre of the copper industry, which can never be entirely superseded by new metals for certain classes of chemical plant. The old-established firm of Empress Coppersmiths and Engineers, Ltd., Cornbrook, Manchester, specialise in the manufacture of plant required by the chemical trade and in copper, aluminium and all non-ferrous work for engineers in general. The autogenous welding of copper is a matter into which they have conducted active research and they are now producing plant for the production of certain acids which essentially require this form of construction. They have a wide experience in the manufacture of plant requiring expert craftsmanship such as stills, digesters, macerators and apparatus in pure tin for use in connection with essential oils and essences; and also in heavier classes of work such as plant for the manufacture of sulphate of ammonia.

### Scientific Glass Blowing

Skilful handling, and a knowledge of which glasses will stand the strain put upon them, or the temperatures required, and how far the blowpipe or furnace can be combined to give the results required can only come from a close acquaintance with actual conditions in glass blowing and annealing, and few firms are better placed for gaining and utilising this knowledge than the Scientific Glass Blowing Co., of Manchester. In close proximity to a large School of Research at the University and at the College of Technology, and supplying research laboratories not only locally but in all parts of the country and Dominions, their experience and skill have ripened together and they are able to provide both special apparatus made to specification, as well as all types of standard articles.

### Sacks, Bags, Filter Cloths

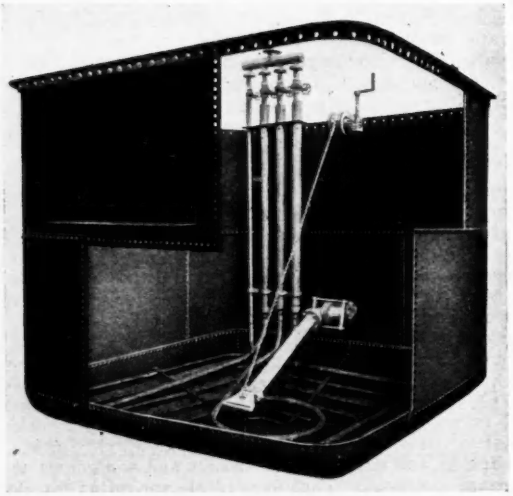
The North Mills Co., Ltd., of 1, Dickinson Street, Manchester, are manufacturers of sacks and bags in cotton, jute and linen and supply liners for sacks, boxes and barrels in various qualities of cotton cloth and crêped paper. They stitch up fabric articles of every description, specialising in making of filter cloths and bags and dust collecting bags and chutes. Their printing plant for the marking of ordinary bags is very comprehensive.

### Aluminium Casting

All types of aluminium castings for chemical and allied industries are to be obtained from the Manchester Aluminium Co., Ltd., Jenkinson Street, Manchester. Orders for customers' own patterns from blue prints or sketches receive prompt and quick delivery, and the firm has some remarkable achievements in the construction of large scale acid-resisting plant to its credit.

### Soap and Chemical Plant

W. Neill and Son, of Bold Iron Works, St. Helens Junction, Lancs., have for some years specialised in complete plants for soap and chemicals, and have supplied several of the largest plants in this country as well as abroad, including plants for glycerine recovery, caustic soda, benzol, aniline



A Steel Soap Boiling Pan with Wet and Dry Coils, made by W. Neill and Son, Ltd.

dyes, tar distillation and cresylic acid, oil extraction, oil refining and hardening, bleaching, etc. They manufacture causticisers, fractionating columns, digesters, vacuum filters, crystallisers and carbonators, cast iron and mild steel pans with agitating gear, vacuum pumps, air compressors, evaporators, pumps for all purposes, filter presses, stills and mixers, jacketed pans, and tanks in cast iron, mild steel or stainless steel.

### Salford Technical College

Systematic instruction in branches of knowledge which have a direct bearing on the leading industries of Salford is provided by the Royal Technical College, Peel Park, Salford. Its eleven departments include those of chemistry, dyeing, calico printing and bleaching, applied physics and electrical engineering and general science classes. The large staff of lecturers and

assistants are all specialists in their own spheres, and the college comprises in addition to the usual lecture theatres and classrooms large laboratories and workshops. Of great help in supplementing the instruction given is the Royal Museum and Library, in the immediate vicinity of the college, containing many valuable scientific and technical books and papers. The college is recognised by the Institute of Chemistry for instruction for the Associateship of the Institute.

### Mixing and Grinding Plant

The engineering business of Follows and Bate, Ltd., began in 1869 with a small works in Dutton Street, Manchester, the present works at Gorton, which are equipped in all departments with most up-to-date plant, being built in 1881. Following the introduction of a high-grade cone paint or enamel mill known as the patent "Universal" cone paint mill, came the production of a number of specialised appliances, principally in the direction of mixing and grinding plant, and the field of operations was gradually enlarged, such industries as the chemical, soap, oil, linoleum, match, foodstuffs, fuel briquetting, road material, dye, calico printing, explosives, and so on being successfully catered for.

In 1923, after protracted experimental work, the patent high-speed "Circulator" mill was placed on the market, originally for the preparation of catalyst materials in the oil hardening industry, and for liquid paint production, and led immediately to important developments. In many industries it was found that processes, formerly involving lengthy treatment in vessels, heated and otherwise, could be performed instantaneously by a rapid passage through this new mill, and a demand, world-wide in extent, at once opened up. It is interesting to note that the largest installation of these mills in a single factory up to date was supplied to the U.S.A., whilst plants embodying the patent "Circulator" mill are in progress for Great Britain, Belgium, France, South America, Spain, U.S.A., for asbestos, soap, paint and fine colour, composition and dyestuffs.

### Reads' Metal Containers

Reads, Ltd., are one of the oldest metal container manufacturers in the country, and their business established in 1869 has progressed so much that to-day they employ 800 to 1,000 people. Their factories, three in number, are equipped with the latest tools and machinery enabling them to produce articles on mass production lines at very competitive prices. They cater for most industries that require tin boxes, plain or decorated, of every description, steel barrels, casks, drums and kegs. Among the many businesses supplied are chemical manufacturers, oil merchants, paints and varnishes and soap manufacturers, petrol distributors, and most government departments. The head offices are at 21, Bridgwater Street, Liverpool.

## Trade Publications

### A New Colorimeter

One of the most interesting recent developments in colorimetry is described in a brochure issued by H. Reeve Angel and Co., Ltd., 9, Bridewell Place, London, E.C.4, on the Toussaint (T.C.B.) Photo-Electric Photo Colorimeter. Its chief function is the elimination of the errors inseparable from the use of the human eye alone for the comparison of colours, and its operation depends on the action of the photo-electric cell, extremely sensitive to light. It consists essentially in a glass bulb containing argon at a low pressure, and having, on its inner surface, a layer of potassium. There is hung, inside the bulb, at a short distance from the potassium, a tungsten ring. The tungsten terminal is connected to the positive pole of a battery and the potassium terminal to the negative pole. In the circuit thus formed a galvanometer is inserted. When a beam of light is directed on the cell, the potassium emits electrons which cause the intensity of the current in the circuit to vary instantaneously. As, within the range of the use of the apparatus, there is an exact proportionality between the light energy acting on the potassium and the intensity of the current in the galvanometer circuit, this latter permits the measurement, in an absolute manner, of quantities of light. It therefore constitutes a very delicate and exact photometer. A colour can be very simply represented by a six (or, if needed, more) point curve obtained by means of a series of filters, each embracing a narrow portion of a typical zone of the spectrum. The light after passing a filter and after diffusion at the test-surface, in the case of solid specimens (or after transmission by transparency, in the case of liquid specimens) is measured by the specially designed and manufactured photo-electric cell and galvanometer combination.

### The "Hyson" Catalogue

The easy reference index is a notable feature of the handsome 200-page catalogue which has just been issued by Smith Brothers and Co. (Hyson), Ltd., engineers, iron and brass founders, Hyson Green Valve Works, Nottingham. It has been made as clear and concise as possible, and each of the twelve sections, readily found by means of a thumb index system, possesses its own contents list. During the last few years the firm has considerably increased the range of its manufactures, notably in connection with fittings for oil, which are suppplied for use at every stage of production. One of its oldest and most important branches is, of course, the manufacture of pressure gauges, the first reliable instrument of the type for measuring steam pressures being invented by Sydney Smith, who established the business in 1847.

### Standard Gas Practice

Some interesting figures are contained in the report recently published on "Standard Practice of the South Metropolitan Gas Company," adopted with a view to securing the efficient, economic, hygienic and safe distribution of gas. From very early days, it appears, the South Metropolitan Gas Company has laid turned-and-bored cast iron mains, and this policy has been justified by the fact that such mains, which have been in the ground for more than fifty years, appear on examination still to be good for an indefinite period. The number of gas meters in use in the company's area of supply is about 412,000, and approximately 73 per cent. are provided with pre-payment slot meters.

### "Welding the World"

The fifth edition of "Welding the World," published by the Suffolk Iron Foundry (1920), Ltd., Gipping Works, Stowmarket, has been carefully revised and enlarged by the addition of twelve pages. The booklet presents in a concise and brief manner an operator's guide to the effective use of "Ferro-Silicon," "Super-Silicon," and "Sifbronze" welding rods, and is well illustrated both with actual photographs and diagrams.

### "Sure Grip" Drive

A leaflet illustrating their "Sure-Grip" Drive has been issued by Crofts (Engineers), Ltd., of Bradford. Its special application is for direct drives from electric motors to all classes of machinery. It is endless, not affected by moisture or atmospheric extremes, and will withstand high temperatures of moist or dry heat. The makers have standardised these drives up to 200 h.p., and claim them to be 98½ per cent. efficient.

## Lord Melchett's Return

### Trade Relations With the Dominions

LORD MELCHETT arrived home last week-end from his tour in South Africa, where he had gone partly for business reasons—Imperial Chemical Industries has large interests there—and partly as a missionary of Empire economic unity, which he advocated at many meetings in the Dominion.

"A great deal of harm," he said, in the course of an interview on Monday, "is being done by those in this country who are always saying that no progress can be made towards Empire economic unity because the Dominions are unwilling to take any steps towards it. Even if it was true that would be an extremely foolish thing to say. But it isn't even true. Of all the Dominions South Africa is the one where, owing to the relations of the Dutch population and the British and other reasons, you would expect the most unfavourable view to be taken. That is what I expected to find. I addressed many important gatherings—including the Capetown Chamber of Commerce and the Inter-Parliamentary Federation—and had discussions with the Prime Minister, General Smuts, and the leading industrialists. Everyone realises the difficulties, but I can only say that the general spirit was quite favourable to anything which will tend towards closer trade relations within the Empire."

Of course, the abolition of tariffs within the Empire simply could not be done under present circumstances. The Dominions had built up their own industries within tariff walls and they would not consent to a scheme which sacrificed them. But apart from tariffs there were many ways of developing trade, not only between this country and the Dominions but between the Dominions themselves.

#### Petrol from Coal

Important experiments were being carried on for the extraction of petrol from coal. This was of great importance to a country which had to import its supplies. Coal could be moved at 4s. 6d. a ton, and it was only 150 ft. from the surface. He was hopeful about it, and while the conditions there were much more favourable, he saw no reason why something of the kind should not be done in this country.

While visiting the gold mines he was struck with the efficiency and skill of the native labour. His general view of the native question was that the future prosperity of the country depends largely upon developing the purchasing capacity of the native. A relatively small increase in the consuming capacity of the native population—which is four times larger than the white population—would mean a big step forward.

## Long Service with I.C.I.

### Presentation of Awards by Mr. Henry Mond, M.P.

THE fourth annual distribution of long service awards to the employees of the United Alkali group of the Imperial Chemical Industries was held in the Recreation Club, Widnes, on Thursday, March 20. In the absence of Six Max Muspratt, owing to the illness of Lady Muspratt, the presentations were made by Mr. Henry Mond, M.P. There was a gathering of representatives of thirty-one sections of the company, with Liverpool, St. Helens, Widnes, and Runcorn associations, in all totalling 135, whose periods of service ranged from twenty-five to fifty-one years. The awards comprised gold and silver watches and chiming clocks according to length of service.

On the previous day Mr. Mond, M.P., presented at the Witton Works, Birmingham, 120 employees at the Midland factories of the company with similar long service awards. The recipients came from Kynochs, Eley Bros., Elliotts' Metal Co., and Allen Everitt's. On Tuesday Mr. Mond handed awards to 26 employees of the Castner Kellner works.

### Spanish Tariff Change

THE Madrid *Gazette* of March 6 publishes a Royal Order abrogating the Royal Order of March 9, 1926, which provided for a temporary system of restricted, conditional or prohibited imports affecting intermediate products and organic artificial colouring materials comprised in Tariff headings 793, 794, 795, and 796 of the Customs Tariff in force. All measures complementary to the 1926 Order which have been promulgated since that date are also cancelled.

## Chemical Matters in Parliament

### Animals and Poison Gas Experiments

MR. TOM SHAW (Secretary of State for War) has promised to obtain and circulate particulars of the numbers and kinds of animals used in each year for experimental purposes at Porton chemical warfare laboratory since its establishment, and the number that have been killed as the result of experiments. In reply to Mr. Ayles (House of Commons, March 25), he stated that no animals are used for experiments at the Sutton Oak laboratory.

### Dyestuffs (Import Regulation) Act

Mr. Mander (House of Commons, March 25) asked the President of the Board of Trade if, in order to allay uncertainties in industries, he can now state the intention of the Government with regard to the Dyestuffs (Import Regulation) Act when it expires at the end of this year; and whether it is intended to renew it in any form.

Mr. W. Graham replied that at present he had nothing further to state. The matter was under consideration and a statement would be made as soon as possible.

### Smoke Abatement

Dr. Hastings (House of Commons, March 20) asked the Minister of Health whether he would be prepared to approve by-laws under the Smoke Abatement Act, 1926, defining noxious smoke as smoke of some specified density as measured by the Ringlemann test, which has been used for many years in the United States.

Mr. Greenwood replied that no local authority in this country had proposed to embody such a test in by-laws under the Act of 1926 and, as at present advised, he did not think it is suitable for that purpose. He added that local authorities generally proceeded by representations and usually prosecuted only as a last resort.

## "C.A." Queries

*We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—*

138. *Soda Ash.*—An inquirer in Hull wishes to be put in touch with suppliers of soda ash.

139. *Hyposulphite of Soda.*—Formulae and full particulars as to the manufacture of Hyposulphite of Soda are required by a London firm.

140. *Warehousing.*—A London firm would be glad to receive the names of any warehouses they could approach for the storage of acetone and isopropyl alcohol, especially with a view to the decanting of these chemicals into 1, 5 and 12 gallon drums.

### Damages for Nitric Acid Injuries

AN action brought by a school girl and her father for damages for personal injuries, sustained by the girl when a bottle of nitric acid fell from a shelf during a chemistry lesson and splashed on her face, ended at Birmingham Assizes on Wednesday, when the jury returned a verdict for the plaintiffs, awarding £900 special damages and £1,000 personal damages to the girl. Judgment was entered accordingly, and a stay of execution was granted. The plaintiffs were Mr. Ernest Partridge, a manufacturer, of Albrighton, Salop, and his daughter, Daphne Grace Partridge, and the defendants The Abbey, Malvern Wells, Ltd., proprietors of the Abbey School, Malvern Wells.

### Graesser-Monsanto Directors

AT the annual ordinary general meeting of Graesser-Monsanto Chemical Works, Ltd., held on Tuesday at the London offices, the following directors were re-elected to the Board: Mr. John F. Queeny, chairman; Mr. John D. Gillis, vice-chairman; Mr. E. M. Queeny, Mr. J. A. Currie, Major T. Knowles, Mr. C. O. Bower, directors. Mr. T. P. Berington was elected a director of the Company. At the ensuing directors' meeting Mr. T. P. Berington was appointed secretary and Mr. F. S. Mortimer assistant secretary.

# From Week to Week

IMPERIAL CHEMICAL INDUSTRIES is among the new members of the Liverpool Organisation for the Promotion of Merseyside Trade and has subscribed £100 to its funds.

POWER CONTRACTS (BATWIN), LTD., London, announce that they have acquired from Power Contracts, Ltd., their Batwin motor department, and that they will be giving service and delivery of Batwin machines from 138-140, Southwark Street, London, S.E.1.

NOMINATIONS must be received before April 14 to fill three vacancies on the committee of the London Section of the Society of Chemical Industry. The three retiring members, Mr. Garland, Dr. Lampitt and Dr. May, are not eligible for re-election for a period of one year.

PROFESSOR F. S. KIPPING, Professor of Chemistry at Nottingham University, delivered the Sir Jesse Boot foundation lecture at the University on Friday, March 21. He took as his subject, "Chemistry and Agriculture," and predicted the time when the chemist would be obtaining man's food entirely from the atmosphere and from water.

CHANGES OF ADDRESS.—The London office of the United Steel Companies, Ltd., and Associated firms, since March 22, is at 16, Great George Street, London, S.W.1. The telephone numbers and telegraphic address remain unaltered.—Mr. Herbert Green has removed his offices to 70, Pall Mall, London, S.W.1.—The Harshaw Chemical Co. announces the removal of its executive and sales offices to 1945 East 97th Street, Cleveland, Ohio.

SOCIETIES OF THE CHEMICAL AND ALLIED INDUSTRIES are holding a North-East Coast dinner at Tilley's Restaurant, Blackett Street, Newcastle-on-Tyne, on Friday next, at 7.30 p.m. The societies to be represented include the Chemical Society, Institute of Chemistry (N.E. Section), Institute of Metals (N.E. Section), North of England Gas Managers' Association, and the Newcastle Chemical Industry Club.

MR. E. N. MARCHANT, chairman of the Manchester section of the British Association of Chemists, speaking at the annual dinner of the section in Manchester, said the Association was thinking of asking the chemical societies to co-operate in calling a conference to consider forming a general chemical council. While it seemed impracticable that chemists should be retained by one society only, it was felt that some such council would provide the most satisfactory contact between the societies.

MR. R. HEWITT, labour manager of the Clayton Aniline Co., Ltd., gave an address on "Employment for Girls" at a meeting called by the Manchester Education Committee on Thursday, March 20. It was only comparatively recently, he said, that girls had found their way into the analytical laboratories, the dye-houses, and the heavy chemical works for engagement in specific routine work, and though the future would bring more opportunities, the indications at the moment were that they would relate to purely routine work.

MR. F. SCHOLEFIELD, who is principal lecturer in textile chemistry in the College of Technology, Manchester, has been awarded the research medal of the Society of Dyers and Colourists for his paper on "The Action of Light on Dye Colours," which was published in the journal of the Society in August, 1928, and further related papers published in September, 1928, and March and June of last year. Altogether fifty-two papers were submitted to the Council for adjudication. Diplomas have been given to Mr. Scholefield's collaborators, Miss E. Hibbert and Mr. C. K. Patel, both of Manchester.

THE UNITED STATES DISTRICT COURT in St. Louis in a decision dated March 4, 1930, declared the Selden Co.'s patent 1,647,317, entitled "Process of carrying on catalytic conversions," to be invalid. "It is quite difficult," the Court held, "to see that there is anything bordering on invention exhibited in the patent in suit. The process of the patent is shown to have been in common commercial use, and exemplified in many patents in the same and analogous arts. In our judgment the patent is so clearly lacking in invention that there is no occasion to consider other matters presented." The Selden Co. filed the suit against the Monsanto Co. in November, 1927, alleging that the latter company's "Phthalic Anhydride process" infringed their patent.

DAMAGE BY FIRE was caused on Thursday, March 20, at the premises of Henry Wilkes, chemical works, Eyre Street, Spring Hill, Birmingham. The blaze, which was in a building used for drying sulphur, was soon extinguished by the Fire Brigade.

THE UNIVERSITY OF ST. ANDREWS has decided to confer the honorary degree of LL.D. on Mr. James Morton, chairman and governing director of Scottish Dyes, Ltd., and Professor Owen Williams Richardson, F.R.S., Yarrow Research Professor of the Royal Society.

MAJOR TULLOCH is reported to have been making a preliminary survey of the Jordan valley north of the Dead Sea, with a view to the construction of a light railway from the Dead Sea to Beisan. The projected line would connect with the railway to Haifa, and would greatly assist in the transport of Dead Sea products.

THE LONDON AND NORTH-EASTERN RAILWAY CO. have appointed Mr. T. H. Turner as chief chemist and metallurgist, with headquarters at Doncaster, in succession to the late Mr. J. H. B. Jenkins. Mr. Turner graduated at Birmingham University, and after a period of service with the Metropolitan-Vickers Electrical Co. returned to the University, and since 1924 has acted as lecturer in metallurgy.

LONG SERVICE CERTIFICATES were presented to fifty employees of firms in membership of the Bleachers' Association, Ltd., by the chairman of the Association, Sir Alan Sykes, at a meeting at Manchester on Friday, March 21. Forty-six were men, and the other four were women, the senior in point of service being William Constantine, who has been employed for 55 years by J. Marsden and Co., Ltd., Burnden Bleach Works, Bolton.

CARWARDINE'S SOAP AND CANDLE FACTORY at Bedminster, Bristol, was completely gutted last week by a fire which broke out in the machine room shortly after the employees had left for the night. Only the day before a big stock of new wax material had been brought into the factory and was stored in a large building opposite the part where the fire was fiercest. Fortunately, the firemen managed to keep this part of the premises intact.

MR. GEORGE HALL, chairman of the special committee appointed to investigate the scientific treatment of coal, made the following declaration at Aberdare recently:—"We are on the eve of presenting our report on investigations which have been conducted by the special committee. Without disclosing secret results, I can say that new developments are possible that will do more to put the coal industry on its legs than anything else. A dozen different processes for extracting oil, etc., have been discovered and the experiments have proved that 60 per cent. of our coal can be scientifically treated."

THE ELECTRIC FURNACE CO., LTD., of 17, Victoria Street, London, S.W., have just received an order for an Ajax-Northrup high frequency furnace of 25 cwt. capacity from a French steelworks, which had previously installed two smaller furnaces of the same type. This furnace will have an output of over 1 ton per hour. Since the first commercial sized high frequency furnace was installed in Sheffield about 2½ years ago, the Electric Furnace Co., Ltd., have installed or have under consruction 27 Ajax-Northrup furnaces of a total capacity of 5,350 kilowatts, in addition to 78 laboratory sized furnaces of the same type.

SOLIDOL CHEMICAL (FRANCE), LTD., held its first annual meeting in London on Monday, when Sir Francis C. R. Price presided and in reviewing the balance sheet stated that the item "Sales, Patent and Trade Mark Licence Rights, £275,000" represented the total cost of purchasing rights to trade in "Lysolats" and other products in France, and the French Colonies in particular, and also in all countries except the British Empire, the United States of America, China and Japan. Their company had obtained full control of the business of the Société Française du Lysol. The cost of the share capital was £13,340, and for this they had acquired extensiveproperty, comprising an up-to-date freehold factory, well-equipped plant for the manufacture and distribution of Lysol, and the trade mark name "Lysol," as well as other trade marks.

### Obituary

MR. LAWRENCE JOHN ARNOLD, for nearly 50 years with William Gossage and Sons, Widnes, aged 75.

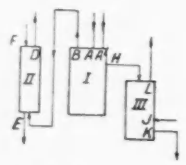
# Patent Literature

*The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.*

### Abstracts of Accepted Specifications

324,122. HYDROGEN AND PHOSPHORIC ACID. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 20, 1928.

Phosphorus is treated with water vapour at high temperature and pressure, and the products subjected to another pressure treatment. Phosphorus and water vapour enter a vessel I

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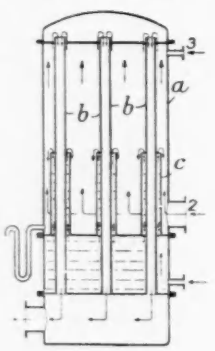
at A and $A^1$, and the acid formed in the reaction passes through pipe H to vessel III, to which water vapour is admitted at J. Hydrogen is drawn off at L and acid at K. Steam, hydrogen, and phosphine pass from the vessel I at B, and are treated in a vessel II with steam entering at F. Hydrogen is drawn off at D, and weak phosphoric acid at E. Alternatively, the gaseous and liquid products from the vessel I may be treated together. The first treatment may be at 300°-400° C. and pressure up to 500 atmospheres, and the second treatment under the same conditions if in two separate vessels, or at 400 atmospheres if in a single vessel.

324,158. EXOTHERMIC GAS REACTIONS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 19, 1928.

In the production of hydrogen from water-gas, the reaction tubes *b* are surrounded at the lower ends by water jackets *c*

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and at the upper ends by a jacket *a* through which water gas entering at 2 circulates. The course of the gas is indicated by the arrows. The hot reaction gases vaporise the water in the jackets *c* and carry the steam with them.

324,189. OXIDATION PRODUCTS OF PARAFFIN HYDROCARBONS, WAXES, ETC. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 14, 1928.

Paraffin wax, paraffin oil, or montan wax are oxidised with gas mixtures containing oxygen. The reaction is stopped before discoloration occurs and the oxidation products removed by sweating, pressing, centrifuging, saponifying, or extracting with solvents such as alcohols, pyridine, or acetone.

324,190. NITRIC OXIDE. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 14, 1928.

Oxides, carbonates, or sulphides of metals of the 2nd to 8th group are treated with a mixture of nitrosyl chloride and carbon monoxide at 100°-1000° C. Nitric oxide and chlorides or oxychlorides are obtained. The treatment of compounds of aluminium, zinc, tin, magnesium, lead, antimony, chromium, manganese, iron, titanium, and zirconium is referred to, and certain non-metallic compounds may also be treated.

324,220. NITROGEN OXIDES. J. Y. Johnson, London. From L. Bergfeld, Heidelberg, Germany. Application date, January 16, 1929.

Gases from the oxidation of ammonia or from the arc process are treated with aqueous solutions of compounds of hexavalent chromium, or of manganese of a higher valency than two, *e.g.*, potassium chromate, or dichromate, calcium permanganate, manganic sulphate or phosphate. The nitrogen oxides are absorbed, and may be obtained in concentrated form by heating the solutions or the residues obtained by evaporation.

324,287. INDIARUBBER. Dewey and Almy Chemical Co., and D. M. Stevens, Harvey Street, Cambridge, Mass., U.S.A. Application date, March 19, 1929.

Aqueous rubber dispersions are cured, without using sulphur, by treating with an active oxygen agent such as *m*-dinitrobenzine, *sym*-trinitrobenzene, potassium permanganate, or benzoyl peroxide and interrupting the reaction when required by adding a reducing agent such as iron or aluminium powder.

324,311. DYES AND INTERMEDIATES. J. F. Dunworth, J. Thomas, and Scottish Dyes, Ltd., Earl's Road, Grangemouth. Application date, July 16, 1928.

Amino-anthraquinones containing only one anthraquinone nucleus are treated at about 100° C. with not less than 3 molecules of benzoylating agent, *e.g.*, benzoyl chloride and *o*,-*m*-, and *p*-chlorbenzoyl-chlorides for each amino group to be benzoylated. In an example, 1-amino-anthraquinone is treated with 5 molecules of benzoyl chloride at 100° C. in chlor-benzene or nitro-benzene solution. 1-Benzoyl-amino-anthraquinone is separated by filtration, and the filtrate is mixed with more benzoyl chloride for use again. 1-Amino-chloranthraquinone may be similarly treated, or may be benzoylated at 96°–98° C. with excess of benzoyl chloride in the presence of sodium acetate and nitro-benzene, and dibenzoyl-1 : 5-diamino-anthraquinone may be similarly prepared from 1 : 5-diamino-anthraquinone. Examples are also given of the benzoylation of 4 : $4^1$-diamino-1 : $1^1$-dianthrimide, and leuco-1 : 4-diamino-anthraquinone.

324,350. SEPARATING HYDROCARBONS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 20, 1928.

The process is for separating mixtures of hydrocarbons having closely adjacent boiling points and different degrees of saturation. The mixtures are fractionally distilled under normal or increased or reduced pressure, with the addition before or during distillation of an organic solvent such as ethylene chlorhydrin, glycol monoacetate or diacetate, glycol monomethyl ether, glycerine di- or tri-acetate, lactic acid nitrile, diethyl tartrate, furfurol, or aromatic bases such as aniline, toluidine, or phenyl-hydrazine. The presence of these organic solvents causes the more saturated hydrocarbons to distil first. Thus, a mixture of cyclohexane 80 parts and benzene 20 parts may be distilled with ethylene chlorhydrin 70 parts, at 25° C. in a column at 100 mms. pressure. The cyclohexane distils off, and the benzene remains in solution in the ethylene chlorhydrin. In another example, a mixture of butadiene 85 parts and α-butylene 15 parts is treated with ethylene chlorhydrin and distilled. The first fraction is α-butylene at 50° C. and 5 atmospheres pressure, and this is followed by 98 per cent. of butadiene.

324,357. FRACTIONAL DISTILLATION. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 20, 1928.

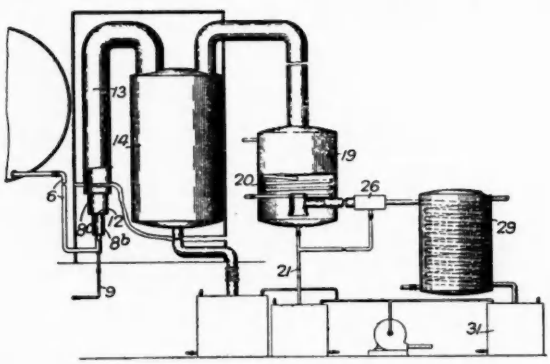
A mixture of gases having boiling points lying close together and containing ether or an organic chloride boiling below 20° C. is separated by distillation under pressure.

324,375. CONCENTRATING LATEX. Dunlop Rubber Co., Ltd., 32, Osnaburgh Street, London, E. A. Murphy and D. F. Twiss, Fort Dunlop, Erdington, Birmingham. Application date, July 26, 1928.

Rubber or like dispersions are treated with non-coagulating hygroscopic substances such as poly-hydric alcohols and their derivatives such as glycerol, glycol, diethylene glycol, or alkyl esters such as monoalkyl ether, and protective colloids. The water is evaporated, and reversible pastes are obtained containing about 3 per cent. of water. Suitable colloids include alkali oleates and ricinoleates, and piperidine oleate. The stability of the pastes may be reduced by adding formaldehyde or calcium sulphate, and the pastes may be made irreversible by kneading, moulding, calendering, or extruding, or by heat, or by treating with coagulants or dehydrating agents. Water soluble colloids may be removed by washing, and this may vulcanise the rubber if sulphur and an accelerator has been added.

324,376. DISTILLING HYDROCARBONS. H. Wade, London. From Standard Oil Co. of Indiana, Chicago, U.S.A. Application date, August 21, 1928.

Heavy hydrocarbon oils such as distillation residues are passed through a pipe 6 and throttle 12 into a chamber $8^b$, together with superheated steam from a pipe 9. Vaporisation

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takes place and the mixture passes through another throttle to a chamber $8^c$, where further vaporisation takes place, and thence through a third opening to a passage 13 in which the temperature is 700°–750° C. The residues are separated in a chamber 14, and the vapour passes to a chamber 19 having a cooling coil 20. The condensate is discharged by a pipe 21 and steam passes to a condenser 29.

324,382. METAL CARBONYLS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 27, 1928.

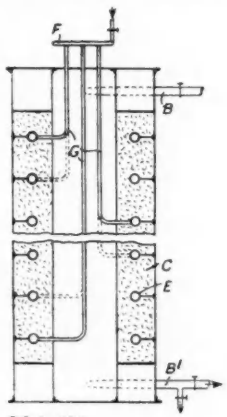
The oxides contained in roasted pyrites or oxidic ores are reduced above 500° C., the reduction and cooling being effected quickly to avoid sintering. The reducing agent may be hydrogen, carbon monoxide, hydrocarbons or solid carbon, and the reduction may be effected in a rapid stream of reducing gas, or with gas under pressure, or by passing the material through a revolving furnace. The subsequent cooling is effected in a chamber having external cooling ribs or cooled by air or water. The production of carbides during reduction is avoided, *e.g.*, when using methane, by employing temperatures only slightly above 500° C., and when using carbon monoxide, by diluting with carbon dioxide and employing temperatures of 800°–950° C. Reduced metal obtained in this manner is particularly suitable for the production of metal carbonyls.

324,484. DYE INTERMEDIATES. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 20, 1928.

3-Methyl-5-chlorbenzene-1-thioglycollic-2-carboxyamide is treated with bromine in the presence of sulphuric acid, either with or without iodine, at a temperature below 30° C. to obtain the corresponding 4-brom compound. 2-Cyano-3-methyl-5-chlorbenzene-1-thioglycollic acid is treated in a similar manner, with or without mercury as a catalyst. 2-Cyano-5-methoxy-benzene-1-thioglycollic acid is dissolved in sulphuric acid and treated with bromine. The products are dye intermediates. To obtain 2-cyano-5-methoxybenzene-1-thioglycollic acid, *p*-anisidine is treated with sulphur chloride to form the thiazthionium compound, which is treated with caustic alkali to obtain the 1-mercapto-2-amino-5-methoxybenzene. This is followed by condensation with chloracetic acid to give the corresponding *o*-amino-thioglycollic acid, which on diazotising and treating with cuprous cyanide yields the 2-cyano product which is then brominated as above.

324,481. CATALYTIC PROCESSES AND APPARATUS. Compagnie Internationale pour la Fabrication des Essences et Pétroles, 1, Avenue de Villars, Paris. International Convention date, October 24, 1928.

Gases which are to be used for reactivating catalytic materials

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are admitted into the materials through a series of annular perforated nozzles E, supplied from the pipe F through branch pipes G. Gases which are to be treated by the catalytic material C are admitted at B and withdrawn at $B^1$.

324,489. VULCANISING RUBBER. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 27, 1928.

Synthetic rubber is vulcanised with selenium, or selenium and sulphur, *e.g.*, in the ratio 1 : 1, in the presence of accelerators. In an example, a mixture of polymerised butadiene 100 parts, aldol α-naphthylamine 1 part, stearic acid 7 parts, carbon black 70 parts, zinc white 2 parts, selenium 0·75 part, and piperidyl dithiocarbamic acid 1·5 parts is heated under a steam pressure of 3 atmospheres for 50–150 minutes.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE, when they became open to inspection under the International Convention : 296,000 (S. Seelig), relating to cracking of oils, see Vol. XIX, p. 399 ; 298,955 (I.G. Farbenindustrie Akt.-Ges.), relating to manufacture of oxythionaphthenes, see Vol. XIX, p. 590 ; 299,765 (C. J. Hansen), relating to removal of ammonia and sulphuretted hydrogen from gases, see Vol. XX, p. 13 ; 300,557 (I.G. Farbenindustrie Akt.-Ges.), relating to azo dyestuffs, see Vol. XX, p. 82 ; 300,923 (I.G. Farbenindustrie Akt.-Ges.), relating to production of glacial acetic acid from aqueous acetic acid, see Vol. XIX, p. 82 ; 300,987 (I.G. Farbenindustrie Akt.-Ges.), relating to polyazo dyestuffs, see Vol. XX, p. 82 ; 306,086 (A. Messerschmitt), relating to decomposition of raw phosphates, see Vol. XX, p. 411 ; 309,577 (Kodak, Ltd.), relating to production of ketene, see Vol. XX, p. 594 ; 309,598 (Deutsche Gaslulicht Auer Ges.), relating to purification of impure titanium dioxide, see Vol. XX, p. 595 ; 311,725 (C. J. Hansen), relating to thiocyanates, see Vol. XXI, p. 58 ; 314,812 (I.G. Farbenindustrie Akt.-Ges.), relating to purification of waste alkali liquors, see Vol. XXI, p. 224 ; 316,284 (Soc. Anon. des Distilleries des Deux-Sèvres), relating to extraction of acetic acid from pyroligneous acid, see Vol. XXI, p. 295.

### Specifications Accepted with Date of Application

297,061. Purification of gases containing hydrogen sulphide. C. Still. September 13, 1927.

300,900. Refined hydrocarbon oils and the like, Production of. I.G. Farbenindustrie Akt.-Ges. November 19, 1927.

301,313. Refining of active carbon. I.G. Farbenindustrie Akt.-Ges. November 26, 1927.

301,832. Froth-flotation concentration of ores. Minerals Separation, Ltd. December 6, 1927.
302,178. Chromium oxide, Manufacture of. I.G. Farbenindustrie Akt.-Ges. December 10, 1927.
302,928. Acid-wool dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. December 23, 1927. Addition to 282,409.
303,021. Separation of Alkoxy-iso-eugenol from alkoxy-iso-chavibetol, and the production of iso-eugenol from the separated compounds. Graesser Monsanto Chemical Works, Ltd. December 22, 1927.
303,384. Producing fast tints on chrome-mordanted fibres, Process for. Soc. of Chemical Industry in Basle. December 30, 1927.
304,209 and 308,963. Cementing and hardening iron, iron alloys and steel. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler. January 16 and April 2, 1928.
304,739. Dyeing esters or ethers of cellulose or of its transformation products. I.G. Farbenindustrie Akt.-Ges. January 25, 1928.
306,959. Gases rich in carbon monoxide, Production of. S.I.R.I. Soc. Italiana Ricerche Industriali. February 29, 1928.
308,250. Neutralisation of the free acidity of oils and fats. J. M. Zumeta and A. M. Yrastorza. March 20, 1928.
308,651. Dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. March 23, 1928.
312,667. Ores, Treatment of. A. Folliett and N. Sainderichin. May 30, 1928.
314,971. Magnetic alloys and methods of making the same. British Thomson-Houston Co., Ltd. July 6, 1928.
326,137. Organic phosphorus compounds, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) November 30, 1928.
326,148. Vat dyestuffs of the benzanthrone series, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 4, 1928.
326,149. Automatic nitriles, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 4, 1928.
326,163. Refining of hydrocarbon oils. W. A. Street. November 5, 1928.
326,176. Complex antimony salts, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 5, 1928.
326,184. Destructive hydrogenation of coal, tars, mineral oils and the like. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 3, 1928.
326,157 and 326,185. Catalysts containing free phosphoric acid, Production of. J. Y. Johnson. *I.G. Farbenindustrie Akt.-Ges.*) October 27, 1928.
326,209. Metal-organic complex salts, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 4, 1928.
326,215. Thymol, Preparation of. Rheinische Kampfer Fabrik. Ges. October 12, 1927.
326,217. Nitrogenous vat dyestuffs, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 7, 1928. Addition to 314,593.
326,226. Aromatic amino-sulphochlorides substituted in the amino group, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) November 30, 1928.
326,227. Carbon monoxide, Continuous manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 1, 1928.
326,231. Complex metallic salts, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) December 6, 1928.
326,236. Sulphates from clays or like argillaceous materials. A. L. Mond. (*Kali-Chemie Akt.-Ges.*) December 8, 1928.
326,238. Hydrogenating coal, oils and similar materials. W. R. Tate, H. P. Stephenson and Imperial Chemical Industries, Ltd. December 8, 1928.
326,263. Vat dyestuffs, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 15, 1928.
326,268. Vat dyestuffs containing nitrogen, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 19, 1928.
326,322. Butylene from ethylene, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) February 22, 1929.
326,378. Sodium metaborate, Production of. A. Kelly. April 9, 1929.
326,398. Nitro compounds, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) Mar 2, 1929.

## Applications for Patents

***[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]***

Bleasdale, H. Manufacture of cellulose acetate. 8,871, 8,872. March 19.
Böhme, Akt.-Ges., H. T. Preparation of aliphatic sulphuric acid compounds. 8,731. March 18. (Germany, March 21, 1929).
Caldwell, J., and Sharpe, F. H. Process of obtaining manganese dioxide. 9,220. March 22.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of vat and sulphur dyestuff preparations. 8,582. March 17.
—— Manufacture of derivatives of quinoline. 9,260. March 22.
Consortium für Electrochemische Industrie Ges. Manufacture of 1 : 1 : 2-trichlorethane. 9,110. March 21. (Germany, March 21, 1929).
County Chemical Co., Ltd. Fertilisers. 8,910. March 20.
Douse, D. F., and Pritchard, J. W. Manufacture of aluminium chloride. 9,095. March 21.
Dreyfus, H. Manufacture of organic products. 9,069. March 21.
—— Manufacture of organic compounds. 9,070. March 21.
Du Pont de Nemours and Co., E. I., and Triggs, W. W. Rubber-coated fabrics. 8,553. March 17.
—— Production of alkyl chlorides. 9,143. March 21.
Du Pont de Nemours and Co., and Imperial Chemical Industries, Ltd. Manufacture of organic mercury compounds. 8,656 March 18.
—— Seed disinfectant compositions. 8,657. March 18.
—— Seed disinfectant compositions. 8,967. March 20.
Du Pont de Nemours and Co., E. I. Ammonia oxidation. 9,144. March 21. (United States, August 21, 1929).
—— Ammonia oxidation process. 9,272. March 22. (United States, August 26, 1929).
Goggs, A. B., and Imperial Chemical Industries, Ltd. Destructive hydrogenation. 9,093. March 21.
Grasselli Chemical Co. and Imperial Chemical Industries, Ltd. Manufacture of insecticides, etc. 8,658. March 18.
Harrison, W. Manufacture of carbohydrate derivatives. 8,789. March 19.
Heap, J. H. Dyeing. 9,267. March 22.
Horsley, G. F., and Imperial Chemical Industries, Ltd. Production of acetaldehyde from acetylene. 8,810. March 19.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Lubricating, etc., internal combustion engines. 8,545. March 17.
—— Production of halogen derivatives of anthraquinone-benzacridone series. 8,546. March 17.
—— Production of sodium hydrosulphite, etc. 8,547. March 17.
—— Production of halogen derivatives of anthraquinonebenzacridone series. 8,670. March 18.
—— Production of chloro derivatives of anthraquinonebenzacridone series. 8,671. March 18.
—— Production of anthraquinonebenzacridone derivatives. 8,672. March 18.
—— Manufacture of polymerisation products. 8,954. March 20.
—— Manufacture of drying oils. 8,955. March 20.
I.G. Farbenindustrie Akt.-Ges. Manufacture of sulphonation products of fats, etc. 8,555. March 17. (Germany, March 15, 1929).
—— Manufacture of artificial rubber-like masses. 8,736. March 18. (Germany, March 18, 1929).
—— Desilification of liquids with recovery of desilicifying agent. 8,849. March 19. (Germany, March 21, 1929).
—— Manufacture of artificial silk. 9,111. March 21. (Germany, March 21, 1929).
—— Production and refining of magnesium-cerium alloys. 9,161. March 21. (Germany, April 15, 1929).
Imperial Chemical Industries, Ltd., and Lilly, C. H. Manufacture of glycerine by fermentation. 8,660. March 18.
Imperial Chemical Industries, Ltd. Catalysts for destructive hydrogenation. 8,829. March 19. (June 19, 1929).
—— Use of triethanolamine in printing pastes. 9,091. March 21.
—— Finishing carpets, etc. 9,092. March 21.
Imperial Chemical Industries, Ltd., and Jones, G. G. Manufacture of glycerine by fermentation. 9,094. March 21.
—— Manufacture of aluminium chloride. 9,095. March 21.
—— Evaporation of caustic alkali solutions. 9,210. March 22.
International Industrial and Chemical Co., Ltd. Manufacture of cyanides, etc. 8,978. March 20.
Morgan, G. T., and Pratt, D. D. Syntheses at high pressures. 8,920. March 20.
Mutual Chemical Co. of America. Manufacture of chromates. 9,222. March 22. (United States, April 3, 1929).
Selden Co. Catalytic oxidation of ammonia. 9,223. March 22. (United States, March 22, 1929).
Soc. Chimique de la Grande Paroisse Azote et Produits Chimiques. Process of synthesising oxygenated aliphatic compounds. 8,664. March 18. (France, January 28).
Soc. Les Fils d'A. Collet. Distributor for chemical solutions. 8,863. March 19. (France, March 20, 1929).
Strong, H. W. Catalysts for destructive hydrogenation. 8,829. March 19. (June 19, 1929).
Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd. Treatment of tars. 8,862. March 19.
Thwaite, A. H. Carbonisation of coal. 8,816. March 19.
Wittouck, S. Manufacture of cyanides, etc. 8,978. March 20.

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.*

## General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID, CHROMIC.—1s. 0⅝d. per lb. d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot £20 to £25 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8¼d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.

CALCIUM CHLORIDE (SOLID).—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9¾d. and 10¼d. per lb. according to quantity d/d U.K.

CHROMOTAN.—Crystals, 3⅝d. per lb. Liquor, £8 15s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4⅜d. per lb. nett d/d U.K spot; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3½d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8½d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77%.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2 cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3⅝d. per lb. nett d/d U.K. spot. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3½d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE CONC. SOLID.—Spot, £10 5s. per ton d/d in drums. Crystals—Spot, £7 10s. per ton d/d in sellers' casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs Commercial—Spot, £9 per ton, d/d station.

## Coal Tar Products

ACID CARBOLIC CRYSTALS.—7d. to 7½d. per lb. Crude 60's, 2s. 4½d. to 2s. 5d. Jan.-June, 2s. 4d. July-Dec. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 6d. per gall. Pure, 5s. 6d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. 3d. Dark, 1s. 6d. to 1s. 10d. Refined, 2s. 7d. to 2s. 10d. per gall.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5¼d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 2s. 1d. per gall. Firm. Pure, 1s. 11d. to 2s. 5d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6¼d. to 6⅝d. per gall. Home, 4d. per gall. d/d. Middle oil, 4¼d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1¼d. to 1½d. per gall. ex works. Salty, 7½d. per gall

NAPHTHA.—Crude, 8½d. to 8⅝d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 6d. per gall. Solvent 90/190, 1s. to 1s. 2½d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £4 10s. per ton. Hot pressed, £8 per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—8½d. per lb. 100% d/d buyer's works.

ANILINE OIL.—8½d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—8½d. per lb. d/d buyer's works.

BENZALDEHYDE.—1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—2s. 4d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—1s. 8½d. per lb. d/d buyer's works.

*o*-CRESOL 29/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

*m*-CRESOL 98/100%.—2s. 9d. per lb., in ton lots d/d.

*p*-CRESOL 32/34° C.—2s. per lb., in ton lots d/d.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 9½d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—8d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7½d. per lb.; 66/68° C., 9d. per lb.

DIPHENYLAMINE.—1s. 8d. per lb. d/d buyer's works.

*a*-NAPHTHOL.—1s. 11d. per lb. d/d buyer's works.

*B*-NAPHTHOL.—£65 per ton in 1 ton lots, d/d buyer's works.

*a*-NAPHTHYLAMINE.—1s. per lb. d/d buyer's works.

*B*-NAPHTHYLAMINE.—2s. 9d. per lb. d/d buyer's works.

*o*-NITRANILINE.—5s. 11d. per lb.

*m*-NITRANILINE.—2s. 6d. per lb. d/d buyer's works.

*p*-NITRANILINE.—1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—6½d. per lb, 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—1s. 6½d. per lb. 100% d/d buyer's works.

*o*-TOLUIDINE.—8d. per lb., drums extra, d/d buyer's works.

*p*-TOLUIDINE.—1s. 9d. per lb. d/d buyer's works.

*m*-XYLIDINE ACETATE.—3s. 1d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

## Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton

BROWN SUGAR OF LEAD.—£38 per ton.

## Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity.

CARBON BLACK.—4 1/16d. to 4¼d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 6d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£9 10s. to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£55 to £60 per ton.

ZINC SULPHIDE.—8d. to 11d. per lb

## Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton, ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity

ACID, BENZOIC B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 4d. per oz. ; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £32 per ton ; powder, £36 per ton ; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 8½d. to 1s. 9½d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. 3d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 3½d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb .spot.

BISMUTH CARBONATE.—7s. 6d. per lb.

BISMUTH CITRATE.—7s. 6d. per lb.

BISMUTH SALICYLATE.—7s. 3d. per lb.

BISMUTH SUBNITRATE.—6s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. per lb.

BISMUTH OXIDE.—9s. 6d. per lb.

BISMUTH SUBCHLORIDE.—9s. 9d. per lb.

BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 11½d. per lb. ; 12 W. Qts. 10d. per lb. ; 36 W. Qts. 9d. per lb.

BORAX B.P.—Crystal, £21 per ton ; powder, £22 per ton ; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

BROMIDES.—Ammonium, 2s. 0d. per lb. ; potassium, 1s. 8d. per lb. ; granular, 1s. 5½d. to 1s. 7¾d. per lb. ; sodium, 1s. 11d. per lb. Prices for 1 cwt. lots.

CALCIUM LACTATE.—B.P., 1s. 3d. to 1s. 5d. per lb., in 1-cwt. lots.

CAMPHOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity ; also special contract prices.

CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity ; other gravities at proportionate prices.

FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.

HEXAMINE.—2s. 3d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall. ; 20 vols., 4s. per gall.

HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb. ; potassium, 2s. 8½d. per lb. ; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 9d. per lb. Green, 2s. 10d. to 3s. per lb. U.S.P., 2s. 7d. to 2s. 10d. per lb.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 9½d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½% ; Heavy commercial, £21 per ton, less 2½% ; in quantity lower ; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 16s. 3d. per lb. net ; Synthetic, 9s. 6d. to 11s. 9d. per lb. ; Synthetic detached crystals, 9s. 6d. to 11s. per lb., according to quantity ; Liquid (95%), 9s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb. ; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb. ; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb. ; Calomel, 7s. 2d. to 7s. 3d. per lb. ; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb. ; Persulph, B.P.C., 6s. 11d. to 7s. per lb. ; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.

METHYL SULPHONAL.—18s. 6d. to 20s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN —3s. 8½d. to 4s. 1d. per lb.

PHENAZONE.—5s. 11d. to 6s. 1½d. per lb.

PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—103s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 6d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—43s. 6d. per lb.

SALOL.—2s. 3d. to 2s. 6d. per lb.

SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.

SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—2s. 2d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 6d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.

SODIUM FERROCYANIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 1d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.

SODIUM SULPHIDE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—9s. 6d. to 10s. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 1s. 10d. per lb.

THYMOL.—Puriss, 7s. 6d. to 8s. 6d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

## Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—12s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—12s. per lb.

AMYL SALICYLATE.—3s. per lb.

ANETHOL (M.P. 21/22° C.).—6s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZYL BENZOATE.—2s. 3d. per lb.

CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.

COUMARIN.—8s. 3d. per lb.

CITRONELLOL.—9s. 6d. per lb.

CITRAL.—8s. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—9s. per lb.

GERANIOL (PALMAROSA).—19s. per lb.

GERANIOL.—7s. 6d. to 10s. per lb.

HELIOTROPINE.—6s. 6d. per lb.

ISO EUGENOL.—11s. 9d. per lb.

LINALOL.—Ex Bois de Rose, 14s. per lb. Ex Shui Oil, 11s. 6d. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—46s. per lb.

SAFROL.—2s. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—13s. 6d. to 15s. per lb. Ex Guaiacol, 12s. 6d. to 14s. per lb.

## Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.

ANISE OIL.—4s. 3d. per lb.

BERGAMOT OIL.—11s. 3d per lb.

BOURBON GERANIUM OIL.—18s. per lb.

CAMPHOR OIL, WHITE.—160s. per lb.

CASSIA OIL, 80/85%.—4s. 9d. per lb.

CINNAMON OIL LEAF.—7s. 9d. per oz.

CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. U.K. port ; pure, Ceylon, 2s. 6d. per lb.

CLOVE OIL (90/92%).—6s. 6d. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 9d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 11s. 6d. per lb.

LEMON OIL.—5s. 3d. per lb.

LEMONGRASS OIL.—4s. per lb.

ORANGE, SWEET.—11s. 3d. per lb.

PEPPERMINT.—12s. 6d. per lb.

# London Chemical Market

***The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.***

*March* 27, 1930.

THE amount of business during the current week has been fairly satisfactory with prices very steady. Export business has been fair.

## General Chemicals

ACETONE.—Firm at £71 10s. to £80 per ton and in steady demand.

ACETIC ACID.—In very good demand at £36 10s. for 80% technical and £37 10s. per ton for 80% edible.

ACID CITRIC.—Still rather weak and in poor demand at about 1s. 10d. per lb., less 5%.

ACID LACTIC.—Unchanged at £43 per ton for the 50% by weight pale quality and in fair demand.

ACID OXALIC.—Very firm at £30 7s. 6d. to £32 according to quantity and in good request.

ALUMINA SULPHATE.—£8 to £8 15s. per ton for the 17-18% iron-free quality—position firm.

ARSENIC.—Quiet at £16 5s. to £16 10s. per ton, free on rails at mines.

BORAX.—Very firm and in increasing demand.

CREAM OF TARTAR.—A little easier at about 100s. per cwt.

COPPER SULPHATE.—Unchanged.

FORMALDEHYDE.—£35 per ton and in steady demand.

LEAD ACETATE.—£42 per ton for white and £41 per ton for brown, and in steady request.

LEAD NITRATE.—Unchanged at about £33 per ton.

LIME ACETATE.—Unchanged.

LITHOPONE.—Steady at £19 15s. to £23 per ton according to grade.

POTASSIUM CARBONATE.—£27 for 96-98% arsenic free quality.

PERMANGANATE OF POTASH.—A little firmer at 5½d. per lb., for the B.P. quality crystals and in good demand.

SODIUM ACETATE.—Steady at £21 10s. to £22 per ton.

SODIUM BICHROMATE.—Firm at 3⅝d. per lb. and in good demand.

SODIUM HYPOSULPHITE COMMERCIAL CRYSTALS.—£8 10s. to £9 per ton. Photographic crystals £14 15s. per ton. The improved demand continues.

SODIUM NITRITE.—In fair request at about £20 per ton.

SODIUM PRUSSIATE.—Firm at 4¾d. to 5¼d. per lb.

SODIUM SULPHIDE.—Unchanged and in steady request.

TARTAR EMETIC.—Unchanged at 11d. per lb.

ZINC SULPHATE.—£13 per ton with a little better demand.

## Coal Tar Products

There is nothing fresh to report in the Coal Tar Product market, prices remaining unchanged from last week.

MOTOR BENZOL.—Unaltered, at about 1s. 5½d. to 1s. 6d. per gallon, f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA.—Quoted at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL.—Unchanged, at 3d. to 3½d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Remains at 2s. per gallon for the 98/100% quality, and at 1s. 10d. per gallon ex works for the Dark quality 95/97%.

NAPHTHALENES.—The firelighter quality is quoted at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH.—Quoted at a nominal figure of 45s. to 47s. 6d. per ton, f.o.b., East Coast Port.

## Nitrogen Fertilisers Market

*Sulphate of Ammonia.—Export.*—The demand for sulphate of ammonia for immediate consumption continues to be satisfactory and the price remains steady at £8 3s. 6d. to £8 5s. per ton f.o.b. U.K. port in single bags. In the United States it is reported that the demand is well up to that of last year, and prices have a strengthening tendency. *Home.*—Most merchants report that sales are on a lower scale than last year and many are pessimistic about sales for the next month or two. Good buying is reported from Scotland.

*Nitrate of Soda.*—A good move out was reported during the month of February. It is anticipated that stocks will be reduced further during the present month. In the United States the scale prices are firmly held and re-selling at below the schedule prices has become negligible.

## Latest Oil Prices

LONDON, March 26.—LINSEED OIL was easy and 12s. 6d. to 15s. per ton lower. Spot, ex mill, £40; April, £37 15s.; May-August, £37 2s. 6d.; September-December, £37, naked. RAPE OIL was firm. Crude, extracted, £36 10s.; technical, refined, £38, naked, ex wharf. COTTON OIL was steady. Egyptian crude, £28; refined common edible, £32 10s.; and deodorised, £34 10s., naked, ex mill. TURPENTINE was quiet and 3d. per cwt. lower. American, spot, 43s. 6d.; and April to June, 43s. 9d., sellers; Russian, spot, 40s.

HULL.—LINSEED OIL.—Spot, £40; March and April, £39; May-August, £38 15s. per ton, naked. COTTON OIL.—Egyptian crude, spot, £28 10s.; edible refined, spot, £31 15s.; technical, spot, £31 5s.; deodorised, spot, £33 15s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £31 10s. per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot, £33; deodorised, spot, £37 per ton. SOYA OIL.—Extracted and crushed, spot, £30 10s.; deodorised, spot, £34 per ton. RAPE OIL.—Crushed/extracted, spot, £35 10s.; refined, spot, £37 10s. per ton. TURPENTINE.—Spot, 46s. 3d. per cwt. CASTOR OIL and COD OIL unaltered.

## South Wales By-Products

THERE is no change in South Wales by-product activities. Business in most products remains on the quiet side and there are no prospects of any immediate improvement. Pitch continues to have a weak demand with prices unchanged at about 47s. to 49s. per ton delivered. Road tar is in moderate request at from 11s. to 13s. per 40-gallon barrel. Motor benzol is unchanged. Refined tars have fallen off in demand, but prices of both coke-oven and gasworks tar are unchanged. Creosote is weak at from 2¾d. to 3¾d. Solvent naphtha is in moderate request, at from 1s. 3d. to 1s. 5d. per gallon, but heavy naphtha remains quiet at from 11d. to 1s. 1d. per gallon. Sulphate of ammonia has a small but steady call round about £10 2s. per ton. Patent fuel and coke exports are slightly better. Patent fuel quotations for export are: 22s. 6d. ex ship Cardiff; from 1s. to 1s. 6d. less, ex ship Swansea and Newport. Coke, furnace and foundry grades, are unchanged at all South Wales ports.

## Scottish Coal Tar Products

COMPARATIVELY few orders have been placed during the week and values are unchanged in most products. Sixties carbolic, which is not produced in Scotland to any great extent, is firm in tone, and cresylic is also a good market.

*Cresylic Acid* is being maintained in value and supplies are short, particularly for prompt delivery. Pale, 99/100%, 1s. 11d. to 2s. per gallon; pale, 97/99%, 1s. 10d. to 1s. 11d. per gallon; dark, 97/99%, 1s. 8½d. to 1s. 9½d. per gallon; all f.o.r. works in buyers' packages. High boiling acid is steady at about 1s. 9½d. to 1s. 11½d. per gallon.

*Carbolic Sixties.*—Some business has been done at the equivalent of about 2s. 4d. to 2s. 5d. per gallon for ordinary quality.

*Creosote Oil* continues to be without interest and prices are easy as follows: Specification oil, 3d. to 3½d. per gallon; gas works ordinary, 2⅞d. to 3⅜d. per gallon; washed oil, 3d. to 3½d. per gallon; all ex works, naked.

*Coal Tar Pitch.*—There is little or no business passing and prices are nominal. Export value is about 47s. 6d. per ton f.a.s. Glasgow, and home value is about 50s. to 52s. 6d. per ton, ex works.

*Blast Furnace Pitch.*—Orders are scarce but controlled prices remain unaltered at 30s. per fon f.o.r. works for home trade and 35s. per ton f.a.s. Glasgow for export.

*Refined Coal Tar.*—Prompt orders are scarce, but quotations remain steady at 3⅞d. to 4⅜d. per gallon f.o.r. makers' works in buyers' packages.

*Blast Furnace Tar* remains at 2¾d. per gallon.

*Crude Naphtha* is being offered at 4¾d. to 5¾d. per gallon, according to quality.

*Water White Products.*—There are very few orders passing and values are steady at 1s. 2d. to 1s. 3d. per gallon for 90/160 solvent and 1s. to 1s. 1d. per gallon for 90/190 heavy. Motor benzole remains at 1s. 6¼d. to 1s. 6¾d. per gallon.

## Bismuth Salts Prices Reduced

MAY AND BAKER, LTD., London, announce a reduction in the prices of Bismuth salts. The new prices are as under, and apply only for cash terms:—

| | 8 lb. and under 28 lb. | 28 lb. and under 1 cwt. | Not less than 1 cwt. |
|---|---|---|---|
| Bismuth carbonate ..... | 8/3 | 7/9 | 7/6 lb. |
| ,, citrate ..... | 8/3 | 7/9 | 7/6 ,, |
| ,, nitrate cryst. ..... | 5/9 | 5/3 | 5/– ,, |
| ,, oxide ..... | 10/3 | 9/9 | 9/6 ,, |
| ,, salicylate ..... | 8/– | 7/6 | 7/3 ,, |
| ,, subchloride ..... | 9/6 | 9/– | 8/9 ,, |
| ,, subgallate ..... | 8/– | 7/6 | 7/3 ,, |
| ,, subnitrate ..... | 7/3 | 6/9 | 6/6 ,, |

A rebate of 3d. per lb. is allowed on sales of not less than 2 cwt. (either for prompt delivery or on contract), provided delivery is completed or paid for within three months.

# Scottish Chemical Market

*The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

*Glasgow, March 26, 1930.*

BUSINESS in the heavy chemical market has been rather quiet this week, and it is anticipated that no activity will be noticed for some little time, possibly due to the interpretation which has been put on recent utterances in Parliament. Prices at the moment remain fairly steady, and there are no changes of any importance to record.

### Industrial Chemicals

ACETONE, B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Quoted 8d. per lb. delivered.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. per lb., less 5%, ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at same price, viz.: 3½d. per lb., ex store. Offered from the Continent at 3½d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 4d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA, ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Rather easier and Spot material now obtainable at round about £34 per ton, ex wharf. On offer for prompt shipment from China at £30 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £18 per ton, ex wharf, prompt despatch from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports. For Continental material price would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. per ton to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £35 per ton, ex store. Continental mater al on offer at about £34 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—Quoted 4½d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton, ex store. Offered from the Continent at £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100%.—Powder quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums, £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums, and £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyers' premises with concession for contracts.

SODIUM CARBONATE. (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 13s. per ton, ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £10 2s. per ton, carriage paid buyers' sidings, minimum 5-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 55s. per ton, ex works, 57s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid, 60/62%, £9 15s. per ton. Broken, 60/62%, £10 15s. per ton. Crystals, 30/32%, £7 17s. 6d. per ton, all delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. od. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material offered at round about £20 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

## Exaggerated Gas Dangers

### Major F. A. Freeth on Chemical Warfare

"GAS is undoubtedly a potent weapon within a restricted range, but I would like to protest against the idea which many people have that science is possessed of gases of amazing deadly killing power," Major F. A. Freeth, F.R.S., stated in the course of a lecture on "The Chemistry of War" at the Royal United Service Institution on Wednesday, March 19. "There is a considerable amount of well-informed opinion which holds that mustard gas—which is not a gas at all but a dark liquid—is the only really effective one for military purposes.

"One of the greatest disservices which the public Press of this country can do is to alarm the civil population with all sorts of stories about the dangers, which, bad as they are, are not half so bad as they are made out to be. In any future war one of the most important matters will be the nerves of the population, and if you bring up a generation whose whole idea is that cancer is a bed-time story for children compared to the effects of gas a great deal of harm will be done.

"Do any of you think, if you were standing seventy-five yards away from a gas bomb when it dropped, and were not hit by a piece of the metal, that you would be hurt?"

Asked whether the idea of towns and villages being wiped out by bombs was ridiculous, the lecturer reminded his audience that it took a very long time to wipe out Ypres. If two-ton bombs fell on a small village that village would be blotted out. "But," he added, "you will not blot people out over a large area with gas, I am perfectly certain."

# Manchester Chemical Market

(From Our Own Correspondent.)

*Manchester, March 27, 1930.*

Current reports concerning textile conditions indicate a somewhat better tone, but chemical trade interests on this market are inclined to see whether it develops or is maintained before they attach much significance to it. Certainly any marked improvement in the cotton and woollen trades would react favourably and quickly on the movement of a good many lines of chemicals. In the meantime the demand locally is of moderate dimensions, with some inquiry about for early delivery parcels. There is a certain amount of weakness in evidence in the acid section, but otherwise most products are steady.

### Heavy Chemicals

A quietly steady business has been reported this week in respect of bichromate of soda, offers of which are well held on the basis of 3⅜d. per lb., less 1 to 2½ per cent. There is a restricted demand about for Glauber salts, with values ranging from about £2 15s. to £3 per ton. Alkali is firm and is attracting some attention at round £6 per ton, with bicarbonate of soda in more or less similar position at about £10 10s. per ton, both in contracts. Chlorate of soda meets with a moderate volume of inquiry at from £25 to £27 per ton, ex store and according to quantity. With regard to hyposulphite of soda, a quiet business is going through at £15 10s. per ton for the photographic kind, and round £9 10s. for the commercial quality. Contract deliveries of caustic soda are of fair extent considering conditions at the consuming end, and prices are very firm at from £12 15s. to £14 per ton, according to strength. There is only a quiet demand about for dibasic phosphate of soda, but at about £11 per ton values keep steady. Moderate sales of saltcake are being made at up to £3 per ton. Sulphide of sodium is not very active, but prices in this section are well held at about £10 per ton for the 60-65 per cent. concentrated solid quality, and round £8 per ton for the commercial grade.

There is a quiet demand about for chlorate of potash at from £26 to £28 per ton, according to quantity. Sales of caustic potash are of moderate extent, with current quotations at from £30 to £31 per ton. Bichromate of potash keeps firm at 4⅜d. per lb., and inquiry during the past week for this material has been of fair extent. The demand for carbonate of potash is on the quiet side, with supplies obtainable at about £26 5s. per ton. Permanganate of potash is held at 5⅜d. per lb. for the B.P. grade, and about 5¼d. for the commercial quality, although buying interest continues rather subdued. Yellow prussiate of potash is unchanged in price, and a fair weight of business is being put through; offers range from 6¾d. to 7¼d. per lb., according to quantity.

The demand for arsenic on this market is rather slow, and quotations not too strong, offers being made at down to about £15 15s. per ton at the mines for white powdered, Cornish makes. Buying interest in the case of sulphate of copper is of moderate extent, with values at from £26 5s. to £26 10s. per ton, f.o.b. The lead materials are not too strong, and the demand this week has been only on quiet lines; the acetates are at £38 and £37 per ton for white and brown, and the nitrate at £31 10s. to £32. Acetate of lime is in moderate request at round £15 10s. per ton for the grey material and £7 10s. for the brown.

### Acids and Tar Products

Acetic acid is well held at about £36 per ton for the 80 per cent. commercial quality and £66 for the glacial, and a fairly steady business in this section is being put through. Oxalic acid is about maintained at £1 12s. 6d. per cwt., ex store, a moderate inquiry being reported. Tartaric acid has been rather quiet, and values are being shaded to about 1s. 3d. to 1s. 3¼d. per lb. The same may be said in respect of citric acid, down to 1s. 9d. per lb. having been quoted for this material during the past week.

A moderate trade is being done in the case of pitch, which shows little alteration in prices, round 47s. 6d. per ton, f.o.b., still being quoted. Creosote oil is quiet and easy still at from 3¼d. to 4d. per gallon, naked. There is a fair inquiry about for carbolic acid crystals at 7¼d. per lb., 60's crude being about unchanged at 2s. 6d. per gallon. Solvent naphtha is steady and in moderate request at round 1s. 3d. per gallon naked.

# Company News

Tarmac, Ltd.—A net profit for the year 1929 of £65,600 is reported, against £80,186 for the previous year. The directors propose to pay a dividend of 4 per cent. on the ordinary shares, and to make transfers of £4,000 to general reserve and £500 to staff benevolent fund, leaving £5,097 to go forward.

Solidol Chemical (France).—For the period ended January 31, 1930, the net profit, after charging depreciation of plant and furniture, directors' fees and management expenses, amounts to £5,911. The directors recommend writing off from advertising and development £2,000, from preliminary expenses £1,000 and from underwriting and brokerage £500, leaving to carry forward £2,411.

Limmer and Trinidad Lake Asphalte.—The amount at the credit of the profit and loss account for the year ended December 31, 1929, was £113,561, making with £33,924 brought in, a total of £147,485. A final dividend on the ordinary shares of 9 per cent. free of tax is declared (making 15 per cent. free of tax for the year), placing to general reserve £30,000 and carrying forward £36,610.

British Drug Houses.—For the year 1929 the trading profit amounted to £71,610, from which must be deducted amortisation of leaseholds and depreciation of plant, etc., directors' fees and income tax, amounting to £13,106, and leaving £58,504 which, with the amount brought forward of £11,024, makes £69,528. The directors recommend a final dividend of 5 per cent. (making 8 per cent. for year) on the ordinary shares, placing to general reserve fund £15,000, and carrying forward £10,428.

Reckitt and Sons.—The accounts for 1929 show that the net trading profits amount to £1,277,683, which, with transfer fees, £287, makes £1,277,970. The directors' remuneration, other than managing directors, takes £14,962, depreciation on investments £37,563, debenture interest £32,269, dividends on preference shares £67,985, interim dividends on ordinary £410,400, leaving £714,790, which, with the amount brought forward of £292,036 makes £1,006,826. The directors recommend transfer to reserve fund of £200,000, transfer to development fund £100,000, dividend of 2s. per share and bonus of 3d. per share, less tax, on the ordinary £410,400, and bonus to staff £117,500, carrying forward £178,926.

## Chemical Trade Inquiries

*The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.*

New Zealand.—The New Zealand Government Railway Department is calling for tenders, to be presented in Wellington by July 30, 1930, for the supply of lubricating and gasmaking oils. Reference number B.X. 6,268.

China.—A recently established firm in Tientsin, North China, wishes to act as agents for British manufacturers of fertilisers. Reference No. 256.

Egypt.—H.M. Consul-General at Alexandria reports that the International Quarantine Board of Egypt is calling for tenders, to be presented in Alexandria by April 15, for the supply and delivery of five steam disinfecting stoves and one boiler suitable for coal or oil fuel. Reference No. A.X. 9301.

## New Benn Books

Among the new books announced for early publication by Ernest Benn, Ltd., are the following: *The Letters of Gertrude Bell*, selected and edited by Lady Bell (8s. 6d.); *Collected Verse of Robert Service* (cloth 8s. 6d., leather 12s. 6d.); *Crime in India*, by Sir Cecil Walsh, K.C. (10s. 6d.); *The Forgotten Image*, by Eleanor Scott (7s. 6d.); *No Walls of Jasper*, by Joanna Cannan (7s. 6d.); *A History of Early Chinese Art*, by Dr. Osvald Siren (3½ guineas); *Dr. Serocold*, by Helen Ashton (7s. 6d.); *Blackshirt*, by Bruce Graeme (3s. 6d.). Benn's Sixpenny Library: *Life of Christ*, by Rev. R. J. Campbell; *Evolution*, by E. W. MacBride; *English Educational System*, by Cyril Norwood; *Mind and its Workings*, by C. E. M. Joad; *Edith Sitwell*, (Augustan Books of Poetry).

# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

PYNOGENE CO., Severns Chambers, Middle Pavement, Nottingham, disinfectant manufacturers. (C.C., 29/3/30.) £44 11s. 1d. February 14.

## Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

DANUBE OIL TRADING CO. OF ROUMANIA, LTD., London, W.C. (M., 29/3/30.) Registered March 11, £250,000 debentures and premium of 5 per cent. (secured by Trust Deed dated February 25, 1930) none yet issued; general charge. *Nil. October 19, 1929.

PREMIER DRUG CO., LTD., Manchester. (M., 29/3/30.) Registered March 13, £450 charge, to L. Rothman, The Gables, Bury Old Road, Prestwich, registered moneylender; charged on Fairy Hill House, Marwood Street, Hightown, Manchester. *£1,036. December 27, 1928.

## London Gazette, &c.

### Winding Up Petition

MATTHEWS AND WILSON, LTD. (W.U.P., 29/3/30.) A creditors' petition for winding-up has been presented and is to be heard at the Royal Courts of Justice, Strand, London, on March 31.

## New Companies Registered

EUCALYPTUS PRODUCTS, LTD.—Registered March 25. Nominal capital £1,000 in £1 shares. Manufacturing, research and analytical chemists, chemical manufacturers, etc. A subscriber: T. Chilton, 59, Draycott Avenue, Kenton, Middlesex.

MINES TRADING CO., LTD.—Registered March 22. Nominal capital, £40,000 in £1 shares. To act as mining agents; to deal in ores, metals, minerals, chemicals and chemical products, fertilisers and fertilising products, etc. A subscriber: J. J. Lennon, 117, Fenchurch Street, London, E.C.

"PERFECDIS" CO., LTD., Dolphin Lane, High Street, Poplar, London, E.14.—Registered March 21. Nominal capital, £1,000 in £1 shares. To acquire the business of disinfectant manufacturers now carried on by J. R. J. Jones, J. W. Hardie and J. T. Jones, at 73, Altmore Avenue, East Ham, London, E.6, as "J. R. J. Jones and Son." Directors: J. R. J. Jones and J. T. Jones.

TENNANTS (LANCASHIRE—1930), LTD.—Registered March 19. Nominal capital, £30,000 in 29,500 5 per cent. cumulative preference shares of £1 each and 10,000 ordinary shares of 1s. each. To acquire the business of merchants, manufacturers, exporters and importers of alkalies, acids, manganeses, magnesite and all kinds of chemicals and substances used in the manufacture of chemicals, wharfingers, dealers in metals and general commission agents and merchants, insurance brokers and underwriters, now carried on at 1, Booth Street, Manchester, and elsewhere as "Tennants (Lancashire), Ltd." Directors: F. J. Tennant, Innes House, Elgin, N.B., Rt. Hon. H. J. Tennant, H. H. J. Tennant and R. D. Winsloe.

JOHN TRAVERS, LTD.—Registered March 19. Nominal capital £1,000 in £1 shares. To acquire the business of soap makers, fat melters and refiners carried on by John Travers at St. Albans, Herts. Directors: P. W. T. Palmer, 9, Marlborough Road, St. Albans, S. Hall and H. W. Thomson.

## China Clay Works' Appeal

### Assessment Reduced

THE West Slip China Stone Co., Ltd., appealed before the Appeals Committee of the Cornwall Quarter Sessions at Truro last week against the assessment of their China clay works in the parish of St. Stephen-in-Brannel.

Mr. F. J. Tucker, counsel for the appellants, said that prior to the revaluation under the 1925 Act the company appeared on the rating list at £500. On the new valuation they were put at £1,012. Objection was laid in December, 1929, and the assessment was reduced to £948, but being dissatisfied with the amount of the reduction the company had brought the appeal to court. The quarry in question was three acres in extent and its plant was crude.

Sir Herbert Trustram Eve, who was called as an expert valuer, described the property as the worst China stone pit in the whole of the district, and said its rateable value should be half that of a normal pit.

Addressing the court Mr. Comyns Carr, K.C., for the respondents, said the quarry admittedly was worse in some respects than other quarries, but in other respects it was better, and on the balance it was better to the extent of 1s. 3d. per ton.

After a hearing, which lasted the whole of the day, the chairman said the court had unanimously decided to allow the appeal with costs, and the rateable value would be reduced by £86 to £862.

### New Features at the Ideal Home Exhibition

THE *Daily Mail* Ideal Home Exhibition, which was opened at Olympia by the Lord Mayor of London and the Lady Mayoress, on Monday, March 24, and which will remain open until April 17, is on a very much larger and more lavish scale than in previous years. The inclusion of the new Empire Hall has added no less than two acres of extra floor space, permitting not only the enlargement of certain important sections, but the addition of many new features, including a British Empire Section, adequately demonstrating by the wide variety of foodstuffs exhibited the great resources of the Empire. Other new and popular features include the "Village of Ideal Homes," "Nurseries of the Nations," a fascinating series of attics described as "The Room in the Roof," and a delightful setting of "Gardens of the Artists."

Among the exhibitors are Beatl Sales, Ltd., makers of non-fragile table ware, who are exhibiting for the first time an attractive selection of door furniture and interior fittings made in Beatl, the outstanding features of which are lightness, durability and non-inflammability. United Water Softeners, Ltd., are showing "Permutit" softeners in sizes and at prices suitable for every type of house, and Nobel Chemical Finishes, Ltd., have an interesting range of stains, varnishes and paints for household decoration. "Presotim," an antiseptic wood preservative produced by the Powell Duffryn Steam Coal Co., Ltd., is a British coal tar product which penetrates to the heart of the wood and simultaneously colours the surface, and "Presomet" a bituminous black paint shown by the same company, is recommended for preserving all types of metal work and is stated to be rust resisting, water and acid proof.

### The Laundry Exhibition

THE International Laundry and Allied Trades Exhibition which opened at the Agricultural Hall, Islington, on Monday, and will remain open until April 2, is the largest and most important of its kind ever held in this country. Soap, starch, and other chemical firms are prominently represented and there are some interesting machinery exhibits. In the main hall, Ruston and Hornsby, Ltd., of Lincoln, include in their display one of their patented "Thermox" boilers, a Ruston steam engine, Mark "X.S." and a series of Ruston pumps.